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ESSENTIALS

of

PHARMACY

A READY REFERENCE FOR STUDENTS OF PHARMACY

By

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LANE [illegible]

PHILADELPHIA AND LONDON
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PREFACE

THE new editions of the United States Pharmacopœia and the National Formulary and the advances in pharmacy have made a revision of the Essentials necessary. The present volume has been greatly enlarged and entirely rewritten.

Experience has shown that a compend in the form of questions and answers rather imperfectly met the form of instruction that the author desired to impart. Compends of this character are apt to be misleading—their value is likely to be overestimated by the student. A rearrangement of the work was, therefore, deemed advisable, but administrative work in recent years has deprived the author of the former Essentials of the necessary time to accomplish this. The present volume has been made possible largely through the acceptance of joint authorship by Professor L. D. Havenhill.

The object of the book is not to furnish an exhaustive treatise, but rather to give a simple brief outline of the important pharmaceutic data in convenient arrangement, and to inspire the student to make free use of the U. S. P., N. F., and other works of reference.

The vegetable materia medica has not been touched upon mainly because it would increase the size of the volume beyond the desire of the authors, and because it constitutes a separate subject of sufficient size and importance to be treated independently.

The division of the Essentials into six chapters, each having an alphabetic arrangement, is designed to make reference easy. For the benefit of those who are unfamiliar with this arrangement and for use in locating those subjects that do not conform to it, an index is provided, but in order to use the volume most profitably—to obtain the help which the work is desired to give the student—he must learn to use the volume itself. This, it is hoped, will require only a small amount of effort.

THE AUTHORS.

UNIVERSITY OF KANSAS,
LAWRENCE, KANSAS.
December, 1918.

46419

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LIST OF ABBREVIATIONS

A.	Alcohol.
a.	Alkaloids.
△	Heat.
e. s. a.	Ether-soluble alkaloids.
F. P.	Fatal period.
G.	Glycerin.
g/m.	Grammes per 100 mils of preparation.
g/n.	Grammes per 100 objects, such as pills, troches, etc.
(IX).	Added to Part I, U. S. P. IX.
L. D.	Lethal dose.
m/g.	Mils per 100 grammes of preparation.
M. L. D.	Minimum lethal dose.
m/m.	Mils per 100 mils of preparation (per cent. by volume).
m. p.	Melting point.
P. G.	German Pharmacopœia.
P. I.	International Protocol.
P. R.	Purity Rubric.
q. s.	A sufficient quantity.
q. v.	Which see.
(s).	Sparingly soluble.
sp. gv.	Specific gravity.
t. a.	Total alkaloids.
W.	Water.

ESSENTIALS OF PHARMACY

CHAPTER I

INTRODUCTORY PHARMACY

GENERAL DEFINITIONS

1. **Botany.**—The science of plants: their structure, growth, and classification.
    - (a) *Histologic Botany.*—That branch of botany which treats of the structure of vegetable tissues.
    - (b) *Pharmaceutic Botany.*—That branch of botany which constitutes the basis of the study of pharmacognosy and materia medica.
    - (c) *Systematic Botany.*—That branch of botany which treats of the classification of plants with reference to their degrees of relationship.
2. **Chemistry.**—The science of the composition of material things and the art of determining such composition.
    - (a) *Analytic Chemistry.*—That branch of chemistry which deals with the art of determining the composition of substances.
    - (b) *General Chemistry.*—That branch of chemistry which deals with the origin and composition of material things.
    - (c) *Inorganic Chemistry.*—That branch of general chemistry which treats of those substances which do not contain carbon in a combustible form.
    - (d) *Manufacturing Chemistry.*—The manufacture of chemical substances.
    - (e) *Organic Chemistry.*—That branch of general chemistry which treats of those substances which contain carbon in a combustible form.

(f) *Pharmaceutic Chemistry.*—The chemistry of remedial and curative substances.

(g) *Physiologic Chemistry.*—The chemistry of the tissues and functions of animals and plants.

(h) *Qualitative Chemistry.*—That branch of analytic chemistry which deals with the art of separating and identifying the component parts of material things.

(i) *Quantitative Chemistry.*—That branch of analytic chemistry which treats of the art of determining the percentage composition of material things.

3. **Crystallography.**—The science of crystals and the art of determining their structure and form.

4. **Dispensatory.**—A commentary upon the Pharmacopœia. In addition to the subject matter of one or more pharmacopœias, it contains the subject matter of materia medica. There are three dispensatories published in this country:

    The National Dispensatory, by Hare, Caspari, and Rusby, Lea & Febiger, Philadelphia.
    The United States Dispensatory, by Remington and Wood, Lippincott Co., Philadelphia.
    The American Dispensatory, by Felter and Lloyd, Ohio Valley Company, Cincinnati.

5. **Drug.**—Any substance or mixture of substances used in the treatment or prevention of disease in man or other animals. The term was formerly restricted to dried animal and vegetable substances which were to be used in the treatment of disease. *Crude drugs* are those which have not been changed otherwise than by desiccation or partial comminution.

6. **Materia Medica** (Medicinal Materials).—That branch of medical science which treats of the origin, nature, and mode of action of remedial agents.

7. **Medicine.**—Any substance to which curative properties are attributed prepared for application or administration.

8. **Microscopy.**—The science and art of the use of the microscope.

9. **Mineralogy.**—The science of the occurrence and classification of the constituents of the earth's crust.

10. **National Formulary** (N. F.).—A book containing a list of desirable formulæ, published by the authority of the American Pharmaceutical Association. Legalized through the Food and Drugs Act, June 30, 1906.
11. **Pharmaceutic Arithmetic.**—The arithmetic pertaining to the science and art of pharmacy.
12. **Pharmaceutic Assaying.**—The art of determining the quantity of active therapeutic agent in a drug.
13. **Pharmaceutic Chemistry.**—(See 2, f.)
14. **Pharmaceutic Jurisprudence.**—That portion of the law which applies particularly to pharmacists in the practice of their profession.
15. **Pharmaceutic Latin.**—The Latin terms and expressions pertaining to the art and practice of pharmacy.
16. **Pharmacodynamics.**—That branch of medical science which treats of the action of medicines upon healthy animal organs.
17. **Pharmacognosy.**—The science which treats of the identification and selection of crude drugs.
    (a) *Commercial Pharmacognosy.*—That branch of pharmacognosy which deals with the trade and commerce in drugs.
    (b) *Histologic Pharmacognosy.*—That branch of pharmacognosy which deals with the microscopic structure of drugs.
18. **Pharmacography.**—A description of drugs.
19. **Pharmacology.**—The science of drugs and medicines: their nature, preparation, administration, and effect. It includes Pharmacognosy, Pharmacy, Pharmacodynamics, and Therapy Dynamics. (By some authorities considered as synonymous with Pharmacodynamics, see definition 16.)
20. **Pharmacopœia.**—An authoritative book containing a list of remedial agents of acknowledged efficiency, with tests, descriptions, and formulas for their preparations. With the exception of the Pharmacopœia of the United States all pharmacopœias are issued under the authority of their respective national governments. The United States Pharmacopœia is a legal authority through

Food and Drugs Act of June 30, 1906. It is published by the Committee of Revision of the United States of America. This committee is appointed by the National Convention for the revision of the Pharmacopœia which is composed of delegates from the incorporated medical and pharmaceutic organizations of the United States. This convention, owing to the efforts of Dr. Lyman Spaulding of New York, met first in 1820. It has continued to meet every tenth year since, and the Pharmacopœia at present in force is known as the Pharmacopœia of the United States of America, Ninth Decennial Revision (U. S. P. IX).

21. **Pharmacy.**—The science and art of preparing, preserving, compounding, and dispensing medicines. Also a place where drugs and medicines are sold at retail; a drug store.
    (a) *Commercial Pharmacy.*—Trade or commerce in pharmaceutic products, including business practices.
    (b) *Dispensing Pharmacy.*—The extemporaneous preparation of medicines.
    (c) *Manufacturing Pharmacy.*—The preparation of pharmaceutic products.
    (d) *Practice of Pharmacy.*—Systematic exercises in the pharmaceutic operations.
    (e) *Theory of Pharmacy.*—The exposition of the principles upon which the pharmaceutic operations are based.
22. **Physics.**—The science of the forces and properties of matter.
23. **Physiology.**—The science of the healthy organic functions.
24. **Posology.**—That portion of medical science which pertains to the doses in which medicines may be administered.
25. **Remedy.**—Any agency used in the treatment of disease, including substances (medicines) as well as forces, such as light, heat, electricity, etc. These latter might be called non-medical remedies.
26. **Therapy Dynamics.**—That part of medical science which treats of the actions of medicines on diseased organs.
27. **Toxicology.**—That branch of medical science which treats of poisons, their recognition, effects, and antidotes.

METROLOGY

(Met-rol'ŏ-ji)

Origin.—Gr. *metron*, a measure + *logia*, speak.

Definition.—The science of weights and measures.

Measure.—The expression of quantity in terms of standard units.

Measures.—*Linear Measures.*—Arbitrary standards for determining the extent of a body in one direction.

Cubic or Capacity Measures.—Standard vessels for determining the volume of a substance.

Graduates.—Conical or cylindric vessels, usually glass, so marked (graduated) that the same vessel may be used to determine different volumes. If graduated in denominations of the Apothecaries' system they are called Apothecaries' graduates. If graduated in denominations of the Metric system they are called Metric graduates. If graduated in denominations of both systems they are known as Duplex graduates.

They are designated by terms which indicate their maximum capacity; thus, one whose maximum capacity is 4 fluidounces is known as a 4-ounce graduate.

Weight.—The force with which all bodies on the surface of the earth tend toward its center.

Balance.—An instrument used in weighing, the essential part of which is a lever (beam) having its fulcrum in the middle and supporting a pan or scale at each end. Balances are usually designated by terms indicative of the purposes for which they are employed: thus, prescription, analytic, solution, specific gravity, etc.

Use and Care of the Balances.—The balance is a delicate instrument and should be handled carefully. Keep it clean and see that it is always in equilibrium before use.

See that the weights are in their places in the holder before use, and return them to their respective places when the operation of weighing is completed. Never touch prescription or analytic weights with the fingers; always use forceps. Always read the weights twice. First read from the empty places in the holder, and then check the reading as the weights are returned to their places. To neglect this double reading of the weights frequently leads to serious error.

Always place the substance to be weighed on the same pan—usually for convenience on the left.

Never weigh chemicals upon the bare scale pan unless the pan is made of glass.

See that the pans are clean before leaving the balance.

Always weigh volatile substances in a tightly closed container. The accuracy of the result and the preservation of the balance depend upon the strict observance of this rule.

Special care should be taken to see that all vessels to be weighed are clean and dry before they are placed on the balance. If the balances are provided with a beam arrest, never change the load or the weights without first locking the beam. The observance of this rule is necessary to the proper use and care of the balance.

Analytic balances will, with care, safely carry a load of 100 gm. in each pan; prescription balances, a load of 50 gm. in each pan. Heavier charges should be weighed on special balances.

Weights.—Arbitrary standard bodies used in connection with the balance for ascertaining the force with which bodies tend toward the center of the earth. They are usually arranged in sets, and the individuals bear a simple relation to each other. They are usually made of brass and lacquered to prevent corrosion. The finest sets are plated either with nickel or with gold.

Systems of Weights and Measures.—There are two systems of weights and measures in general use by pharmacists—the English or old system, and the Metric, or new system. The Metric system is also known as the French system and as the decimal system.

ENGLISH SYSTEM OF WEIGHTS AND MEASURES

This system is in general commercial use in the United States and in Great Britain and the British possessions.

Apothecaries' (a̤-poth'ē-kā̤-riz) **Measure.**—*Origin.*—L. *apothecarius*, a shopkeeper.

Definition.—A system of measure used in dispensing medicinal liquids.

TABLE OF APOTHECARIES' (FLUID) MEASURE (UNITED STATES)

60 minims (♏lx) = 1 fluidram (f ʒj).
8 fluidrams (f ʒviij) = 1 fluidounce (f ℥j).
16 fluidounces (f ℥xvj) = 1 pint (Oj).
8 pints (Oviij) = 1 gallon (Cong. j).

Gallon.	Pints.	Fluidounces.	Fluidrams.	Minims.
1 =	8 =	128 =	1024 =	61,440
	1 =	16 =	128 =	7,680
		1 =	8 =	480
			1 =	60

Gallon.—The standard unit of the Apothecaries' system. It is defined (legally) as the volume of 3.785434 liters. It is equal to 231 cubic inches and was originally defined as such.

A *set of Apothecaries' graduates* should consist of at least one each of the following sizes: ½ ounce, 1 ounce, 2 ounce, 4 ounce, 8 ounce, and 16 ounce.

TABLE OF IMPERIAL MEASURE (IMP. OR BRITISH, BR.)

Imperial measure is used in the British Empire and in works on pharmacy and medicine which are published in that country.

60 minims (min. lx) = 1 fluidram (fl.drm. j).
8 fluidrams (fl.drm. viij) = 1 fluidounce (fl.oz. j).
20 fluidounces (fl.oz. xx) = 1 pint (Oj).
8 pints (Oviij) = 1 gallon (C. j).

Gallon.	Pints.	Fluidounces.	Fluidrams.	Minims.
1 =	8 =	160 =	1280 =	76,800
	1 =	20 =	160 =	9,600
		1 =	8 =	480
			1 =	60

Imperial Gallon.—The standard unit of Imperial measure is defined as the volume of 10 avoirdupois pounds of distilled water taken at the temperature of 62° F. It is equivalent to 277.274 cubic inches, or 4.546 liters.

Note.—Not one of the denominations of this table is of the same value as that of similar name in the table of Apothecaries' measure U. S. This fact should be kept in mind when compounding from British formulæ.

Notation.—Roman numerals are used exclusively with Apothecaries' denominations in prescription writing, and in all instances the numerals follow the symbols, thus: f℥xvj, 16 fluidounces; fʒviij, 8 fluidrams, etc.

Fractional parts, other than one-half, are expressed in terms of the next smaller denomination, thus: 8$\frac{3}{10}$ fluidounces would be written f℥viij, fʒij, ♏xxiv.

Fractional parts of the smallest denominations other than one-half are expressed in the fractional forms, using Arabic characters, thus: One-tenth grain, gr. $\frac{1}{10}$; one-fifth minim, ♏$\frac{1}{5}$.

The abbreviation for one-half is *ss*, from the Latin *semis*, half. It is written in the position of the numeral, thus: gr. ss, ½ grain; ℥iss, 1½ ounces.

TABLE OF APPROXIMATE (HOUSEHOLD) MEASURES

Used generally in the administration of medicines.

Household.	Apothecaries.	Metric.
1 Tumblerful is considered equivalent to	f℥viij	240 mils
1 Teacupful is considered equivalent to	f℥iv	120 mils
1 Wineglassful is considered equivalent to	f℥ij	60 mils
1 Tablespoonful is considered equivalent to	f℥ss, fʒiv	15 mils
1 Dessertspoonful is considered equivalent to	fʒij	8 mils
1 Teaspoonful is considered equivalent to	fʒj	4 mils

Note.—The actual volume of a teaspoonful based upon the average capacity of several hundred teaspoons is 80 minims. This allows 6 teaspoonfuls to the fluidounce instead of 8. The French Pharmacopœia as well as the American Association of Medicine and Pharmacy recommend the following equivalents:

1 Tablespoonful = 240 minims (½ fluidounce) = 15 mils
1 Teaspoonful = 80 minims (⅙ fluidounce) = 5 mils

The *drop* (gtt.) is variable in size. For aqueous liquids it approximates 1 minim, and for alcoholic liquids it approximates from ⅓ to ½ minim. The size of the drop depends upon the viscosity, surface tension and density of the liquid, and upon the shape of the dropping surface and the rate at which the drops are formed. When the conditions are carefully controlled the drop affords a fairly accurate and convenient method of gauging small quantities of liquids.

Avoirdupois (av″ọr-dụ̄-poiz′) **Weight.**—*Origin.*—L. *aver*, goods + *peis* (later *pois*), weight.

Definition.—The system of weight used in the United States and Great Britain in commercial transactions. It is used in designating the weight of all commodities except gems and precious metals. *Drugs*, both at wholesale and at retail, are bought and sold by Avoirdupois weight.

TABLE OF AVOIRDUPOIS WEIGHT

$27\frac{11}{32}$ grains (gr.) = 1 dram (dr.).
16 drams (dr.) or
$437\frac{1}{2}$ grains = 1 ounce (oz.).
16 ounces = 1 pound (lb.).
25 pounds = 1 quarter (qr.).
4 quarters = 1 hundredweight (cwt.).
20 hundredweight = 1 ton (T.).

Ton.	Cwt.	Quarters.	Pounds.	Ounces.	Drams.	Grains.
1	= 20	= 80	= 2000	= 32,000	= 512,000	= 14,000,000
	1	= 4	= 100	= 1,600	= 25,600	= 700,000
		1	= 25	= 400	= 6,400	= 175,000
			1	= 16	= 256	= 7,000
				1	= 16	= $437\frac{1}{2}$
					1	= $27\frac{11}{32}$

Grain.—The unit of the Avoirdupois system of weight is now derived from the weight of the kilogram, and is defined as its 1/15432.35639 part. The grain was originally derived from the weight of a grain of wheat taken from the middle of the ear and well dried; later it was derived from the weight of a cubic inch of distilled water under standard conditions. *The grain is of the same value in all systems of weight.*

A *set of Avoirdupois weights* usually consists of one each of the following weights: $\frac{1}{16}$ oz., $\frac{1}{8}$ oz., $\frac{1}{4}$ oz., $\frac{1}{2}$ oz., 1 oz., 2 oz., 4 oz., 8 oz., 1 lb., 2 lb., 4 lb.

Imperial Avoirdupois Weight is used in England and the United Kingdom and differs from the Avoirdupois weight used in the United States only in the following particulars:

One quarter = 28 pounds.
Four quarters, one hundredweight = 112 pounds.
20 hundredweight, one ton = 2240 pounds (long ton).

Apothecaries' Weight.—*Origin.*—L. *apothecarius*, a shopkeeper.

Definition.—A system of weight used in the United States in compounding physicians' prescriptions. It was formerly used in Great Britain, but has been replaced there, to a great extent, by the Avoirdupois weight.

TABLE OF APOTHECARIES' WEIGHT

20 grains (gr. xx) = 1 scruple (℈j).
3 scruples (℈iij) = 1 dram (ʒj).
8 drams (ʒviij) = 1 ounce (℥j).
12 ounces (℥xij) = 1 pound (℔j).

Pound.		Ounces.		Drams.		Scruples.		Grains.
1	=	12	=	96	=	288	=	5760
		1	=	8	=	24	=	480
				1	=	3	=	60
						1	=	20

Scruple.—Rarely used in prescription writing at the present time because of the danger of mistaking the symbol (when hastily made) with the symbol for the dram.

A *set of Apothecaries' weights* for prescription purposes usually consists of one each of the following weights: ½, 1, 2, 3, 4, 5, 6 grain weights, ½, 1, 2 scruple weights, ½, 1, 2 dram weights.

Note.—Of the denominations that are common to both Apothecaries' and Avoirdupois weights, the ***grain is the only one in both*** systems that is equivalent in actual weight.

Troy Weight, often confused with Apothecaries' weight, is used in weighing gold, silver, and other precious metals. It was the official weight of the U. S. P. 1870 and prior pharmacopœias.

TABLE OF TROY WEIGHT

24 grains = 1 pennyweight (dwt.).
20 pennyweights = 1 ounce (Tr. oz.).
12 ounces = 1 pound Troy (℔ Troy).

The pound, ounce, and grain are of the same weight as those in the Apothecaries' system.

METRIC (Met'rik) SYSTEM OF WEIGHT AND MEASURE

This system is in general use in most civilized countries with the exception of the United States and Great Britain. It is the system used by chemists and the one recognized in the United States Pharmacopœia since 1890. This system was originated by the Prince de Tallyrand, Bishop of Autun, in 1790. It was adopted by the French Government in 1799 and legalized in the United States in 1866.

Origin.—Gr. *metron*, a measure.

Definition.—The system of weight and measure in which the meter is the fundamental unit.

Metric Linear Measure.—*Origin.*—Fr. *meter*, the unit of the system.

Definition.—A system of linear measure in which the meter is taken as the fundamental unit.

TABLE OF METRIC LINEAR MEASURE

10 millimeters (mm.) = 1 centimeter (cm.).
10 centimeters = 1 decimeter (dm.).
10 decimeters = 1 meter (M.).
10 meters = 1 dekameter (Dm. or dkm.).
10 dekameters = 1 hectometer (Hm.).
10 hectometers = 1 kilometer (Km.).
10 kilometers = 1 myriameter (Mm. or mym.).

Myria-meter.	Kilo-meters.	Hecto-meters.	Deka-meters.	Meters.	Deci-meters.	Centi-meters.	Milli-meters..
1 =	10 =	100=	1000=	10,000=	100,000=	1,000,000=	10,000,000
	1 =	10=	100=	1,000=	10,000=	100,000=	1,000,000
		1=	10=	100=	1,000=	10,000=	100,000
			1=	10=	100=	1,000=	10,000
				1=	10=	100=	1,000
					1=	10=	100
						1=	10

Meter (mē'tėr), the standard of length, is a bar of platinum-iridium alloy preserved in the French archives which was designed to represent the one-ten-millionth part of the distance from the equator to the north pole. The meter is equivalent in length to 39.37 inches.

Prototypes of the standard meter and kilogram were officially received by the United States Government January 2, 1890, and are in the custody of the National Bureau of Standards at Washington.

Micron (μ), the unit of microscopic measurement, is equivalent to one-one-thousandth millimeter.

Metric Square Measure is used in expressing areas.

The *Table of Metric Measure* differs from the table of Metric Linear Measure in that each of the denominations is prefixed by the word *square* (sq.), and in that it takes 100 instead of 10 of a given denomination to make one of the next higher.

Square centimeter (sq. cm.) is the only denomination of the system which is used to any extent in pharmaceutic practice in the United States.

Metric Cubic Measure is used similarly to English Cubic Measure.

The *Table of Metric Cubic Measure* differs from the table of Metric Linear Measure in that each of the denominations is prefixed by the word *cubic* (c. or cu.), and in that it takes 1000 of a given denomination to make one of the next higher.

Cubic centimeter (Cc.) is the only denomination of the system which is used to any extent in pharmaceutic practice in the United States, and in this instance it is improperly used for milliliter, its theoretic equivalent in volume. Cc. has been replaced by milliliter and contracted to mil in the U. S. P. IX.

Metric Liquid Measure is used in measuring liquids and (like Apothecaries' liquid measure) for purposes of compounding and dispensing.

Definition.—A system of liquid measure in which the volume of a cubic decimeter, called a liter, is taken as the unit.

TABLE OF METRIC LIQUID MEASURE

10 milliliters (ml., mil, or mils) = 1 centiliter (cl.).
10 centiliters = 1 deciliter (dl.).
10 deciliters = 1 liter (L. or l.).
10 liters = 1 dekaliter (Dl. or dkl.).
10 dekaliters = 1 hectoliter (Hl.).
10 hectoliters = 1 kiloliter (Kl.).
10 kiloliters = 1 myrialiter (Ml. or myl.).

Myria-liter.	Kilo-liters.	Hecto-liters.	Deka-liters.	Liters.	Deci-liters.	Centi-liters.	Milli-liters.
1 =	10 =	100 =	1000 =	10,000 =	100,000 =	1,000,000 =	10,000,000
	1 =	10 =	100 =	1,000 =	10,000 =	100,000 =	1,000,000
		1 =	10 =	100 =	1,000 =	10,000 =	100,000
			1 =	10 =	100 =	1,000 =	10,000
				1 =	10 =	100 =	1,000
					1 =	10 =	100
						1 =	10

Liter (lē′tėr).—The unit of the system is defined as the volume of the mass of a kilogram of distilled water at its maximum density (4° C.). Although the liter was originally derived from the meter, being the volume of a cubic decimeter, a recently completed determination of the mass of a cubic decimeter of water shows that the liter as now defined is larger than the cubic decimeter by one-tenth milliliter, or 0.01 per cent.

Mil, *Deciliter*, and *Liter* are the most commonly used denominations.

Mil.—A coined word used in the U. S. P. IX to replace the same value as the cubic centimeter (Cc.) of the former Pharmacopœias.

A *set of Metric graduates* for pharmaceutic purposes should be conical in shape, because they are more easily cleaned than those cylindric in form. A complete set of conical graduates consists of one each of the following sizes: 5, 10, 15, 30, 60, 120, 250, 500, and 1000 mils. A set of cylinders graduated in the Metric system consists of one each of the following sizes: 5, 10, 25, 50, 100, 200, 250, 500, 100, 2000 mils or Cc.

Metric Weight is used in the United States chiefly for scientific and professional purposes.

Definition.—A system of weight in which the mass of the one-one-thousandth part of the volume of a cubic decimeter of distilled water at its maximum density, called the gram, is taken as the unit.

TABLE OF METRIC WEIGHT

10 milligrams (mg.) = 1 centigram (cg.).
10 centigrams = 1 decigram (dg.).
10 decigrams = 1 gram (Gm. or gm.).
10 grams = 1 dekagram (Dg.).
10 dekagrams = 1 hectogram (Hg.).
10 hectograms = 1 kilogram (Kg. or kilo.).
10 kilograms = 1 myriagram (Mg. or myg.).

Myria-gram.	Kilo-grams.	Hecto-grams.	Deka-grams.	Grams.	Deci-grams.	Centi-grams.	Milli-grams.
1 =	10 =	100 =	1000 =	10,000 =	100,000 =	1,000,000 =	10,000,000
	1 =	10 =	100 =	1,000 =	10,000 =	100,000 =	1,000,000
		1 =	10 =	100 =	1,000 =	10,000 =	100,000
			1 =	10 =	100 =	1,000 =	10,000
				1 =	10 =	100 =	1,000
					1 =	10 =	100
						1 =	10

Gramme (Gm.).—The French spelling should be retained in order to avoid mistaking it for *grain* when the latter is carelessly written. The weight is equivalent to 15.4323564 grains. It should be noted that in German and French literature the abbreviation gr. stands for gramme and not grain, as the denomination grain is not used in countries which have adopted the metric system.

Kilogram, the standard unit of the metric system, is a cylinder of platinum-iridium alloy preserved in the French Archives in Paris. It was originally derived from the weight of a cubic decimeter of distilled water taken at its maximum density.

A *set of Metric weights* for prescription purposes should include weights from 10 mg. to 20 gm., and, for ordinary manufacturing purposes, weights from 1 gm. to 1 Kg.

Each denomination of metric weight is usually represented by four weights. A set would consist of the following weights:

Three, 1 mg.; one, 2 mg.; one, 5 gm.; two, 10 mg.; one, 20 mg.; one, 50 mg.; two, 100 mg.; one, 200 mg.; one, 500 mg.; three, 1 gm.; one, 2 gm.; one, 5 gm.; two, 10 gm.; one, 20 gm.; one, 50 gm.; two, 100 gm.; one, 200 gm.; one, 500 mg.; two, 1 Kg.; one, 2 Kg.; one 5 Kg. The sequence is sometimes changed, especially for the smaller weights, so that it becomes: one, 1 mg.; two, 2 mg.; one, 5 mg.; one, 10 mg.; two, 20 mg.; one, 50 mg.; one, 100 mg.; two, 200 mg.; one, 500 mg.; one, 1 gm.; two, 2 gm.; one, 5 gm.; etc., doubling the "twos" instead of the "ones" throughout.

Notation.—Arabic numerals are used exclusively with the metric system in prescription writing, and all quantities are expressed either in whole or decimal parts of the gramme or mil. A line drawn vertically near the right margin of the prescription blank serves the purpose of the decimal point and is called the decimal line. When not otherwise specified it is customary to interpret numerals set opposite liquids in terms of mils, and those set opposite solids in terms of grammes.

The Metric System, because of the simple and uniform relation of the denominations to each other, is the most convenient one for all forms of computation. Like our monetary system, it is a decimal one, and the resemblance is at once evident when milligrams are called mills; centigrams, cents; decigrams, dimes; and grams, units or dollars.

EQUIVALENTS IN WEIGHTS AND MEASURES

FUNDAMENTAL EQUIVALENTS:

One meter = 39.3700 inches.
One bushel = 2150.42 cubic inches.
One gallon = 3.7854345 liters = 231 cubic inches.
One Imperial gallon = 4.5459631 liters = 277.274 cubic inches.
One gram = 15.43235639 grains.

LINEAR EQUIVALENTS:

Metric. *English.*

1 meter = 1.0936 yards = 3.2808 feet = 39.3700 inches
= 39⅜ inches.

English. *Metric.*

1 yard = 0.9144 meter = 91.4402 cm. = 914.4018 mm.
1 foot = 0.3048 meter = 30.4801 cm. = 304.8006 mm.
1 inch = 0.0254 meter = 2.5400 cm. = 25.4001 mm.

CAPACITY EQUIVALENTS:

Metric.		*Apothecaries.*		
1 liter	=	0.2642 gallon	=	2.1134 pints
	=	33.8138 fluidounces	=	61.0234 cubic inches.
1 mil	=	0.0338 fluidounce	=	0.2705 fluidram
	=	16.2306 minims	=	0.0610 cubic inch.

Metric.		*Imperial.*				
1 liter	=	0.2200 gallon	=	1.7598 pints	=	35.1960 fluidounces.
1 mil	=	0.0352 gallon	=	0.2816 fluidram	=	16.8941 minims.

Apothecaries.		*Metric.*	*Imperial.*		*Metric.*
1 gallon	=	3.7854 liters.	1 gallon	=	4.5460 liters.
1 pint	=	473.1793 mils.	1 pint	=	568.2454 mils
1 fl.ounce	=	29.5737 mils.	1 fl.ounce	=	28.4123 mils.
1 fl.dram	=	3.6967 mils.	1 fl.dram	=	3.5515 mils.
1 minim	=	0.0616 mils.	1 minim	=	0.0592 mils.

Apothecaries.		*Imperial.*	*Imperial.*		*Apothecaries.*
1 gallon	=	0.8327 gallon.	1 gallon	=	1.2009 gallons
1 pint	=	0.8327 pint.	1 pint	=	1.2009 pints.
	=	16 fl.oz., 5 fl.dr., 13.9 min.		=	1 pt., 3 fl.oz., 1 fl.dr., 43 minims.
1 fl.ounce	=	1.0409 fl.ounces.	1 fl.ounce	=	0.9607 fl.ounce.
1 fl.dram	=	1.0409 fl.drams.	1 fl.dram	=	0.9607 fl.dram.
1 minim	=	1.0409 minims.	1 minim	=	0.9607 minim.

WEIGHT EQUIVALENTS:

Metric.		*Avoirdupois.*				
1 kilogram	=	2.2046 lb.	=	35.2739 oz.	=	15432.3564 gr.
	=	2 lb., 3¼ oz., 10.5 gr.				

Metric.		*Apothecaries.*				
1 kilogram	=	2.6792 ℔	=	32.1507 oz.	=	257.2059 dr.
	=	2 ℔, 8 oz., 1 dr., 12.35 gr.				

Avoirdupois.		*Metric.*	*Apothecaries.*		*Metric.*
1 pound	=	453.5924 grams.	1 pound	=	373.2418 grams.
1 ounce	=	28.3495 grams.	1 ounce	=	31.1035 grams.
1 grain	=	64.7989 mg.	1 dram	=	3.8879 grams.

Avoirdupois.		*Apothecaries.*	*Apothecaries.*		*Avoirdupois.*
1 pound	=	1.2153 pounds.	1 pound	=	0.8229 pound.
	=	1 ℔, 2 oz., 4½ dr., 10 gr.		=	13 oz., 72.5 gr.
1 ounce	=	0.9115 ounce.	1 ounce	=	1.0971 ounces.
	=	7 drams, 17½ gr.		=	1 ounce, 42½ gr.

VOLUME AND WEIGHT EQUIVALENTS:

For distilled water weighed at 25° C. in air with brass weights:

1 liter	=	996.040 gm.	=	15371.244 gr.		
1 mil	=	0.996 gm.	=	15.371 gr.		
1 cu. inch	=	16.322 gm.	=	251.891 gr.		
1 fl.ounce	=	29.457 gm.	=	454.585 gr.		
1 pint	=	471.312 gm.	=	7273.100 gr.		
1 gallon	=	3770.4098 gm.	=	8.3123 lb. av.	=	8 lb., 5 oz., av.
					=	58185 gr.
1 minim	=	0.0614 gm.	=	0.947 gr.		
1 Imp. fl.oz.	=	28.2998 gm.	=	436.731 gr.		
1 Imp. minim	=	0.05896 gm.	=	0.9099 gr.		

SPECIFIC GRAVITY

Specific gravity is used to establish the identity, strength, and purity of substances, and as a factor in calculating the weight of a given volume of a solid or liquid.

Definition.—Specific gravity is the result (quotient) obtained by dividing a weight of the given substance by the weight of an equal volume of standard substance. Both weights should be taken at definite, preferably the same, temperature. It shows, under specific conditions, how many times heavier the substance is than the weight of the same volume of the standard.

The specific gravity of a substance, solid or liquid, taken at the temperature of the maximum density of water in vacuum is the weight in grams of one mil of that substance.

Standard Substances.—*For Solids and Liquids.*—Distilled water.

For Gases.—Air and hydrogen.

Standard Temperatures for Specific Gravity Determinations:

United States Pharmacopœia, 25° C.
British Pharmacopœia, 60° F. (15.5° C.).
German Pharmacopœia, 15° C.

Temperatures differing from the standard ones are customarily indicated by such expressions as $\frac{15°}{4}$, $\frac{25°}{15}$, $\frac{0°}{0}$, etc., where the numerator indicates the temperature of the given substance and the denominator indicates the temperature of the standard substance.

Picnometer or **specific-gravity bottle,** a small glass bottle so constructed that a given volume of liquid can be measured with great accuracy. Such bottles usually have either a very narrow neck or are provided with a tubular ground-glass stopper.

Hydrometers are floating instruments for determining densities. The customary type consists of an elongated bulb bearing a slender stem of uniform diameter at one end and a sufficient weight at the other end to cause it to stand upright in a liquid.

Hydrometer Jar.—A tall narrow cylindric glass vessel with an expanded base resembling the ordinary cylindric metric graduate, but without the graduations. It is used to hold the liquid in which a hydrometer is to be floated.

CLASSIFICATION OF HYDROMETERS ACCORDING TO CONSTRUCTION

I. WEIGHT CONSTANT. VOLUME OF LIQUID DISPLACED VARIABLE

The most important hydrometers belong to this class. Two kinds are recognized:

1. Hydrometers Having the Graduations Equally Spaced on the Stem. -*Baumé's Hydrometer.*—This was one of the first hydrometers to come into general use and, owing to its cheapness, is still much in demand. Two instruments constitute a set, one for liquids denser than water, the other for liquids less dense than water. To convert Baumé degrees into specific gravity, and vice versa, the following formulæ may be used:

For Liquids Denser than Water:

$$\text{Sp. Gv.} = \frac{145}{145 - \text{B.}^\circ} \qquad \text{Baumé Degrees} = 145 - \frac{145}{\text{Sp. Gv.}}$$

For Liquids Less Dense than Water:

$$\text{Sp. Gv.} = \frac{140}{130 + \text{B.}^\circ} \qquad \text{Baumé Degrees} = \frac{140}{\text{Sp. Gv.}} - 130.$$

2. Hydrometers Having the Graduations Unequally Spaced on the Stem. (*a*) *Specific Gravity Hydrometers.*—These instruments are to be preferred for pharmaceutic purposes because the stem is graduated to read specific gravity direct. The customary range of these hydrometers is from specific gravity 0.600 to specific gravity 2.000. When a high degree of accuracy is required this range is distributed over several instruments, two instruments at least, preferably four or six, and, in special cases, as many as twenty instruments may be included in a set.

(*b*) *Special Purpose Hydrometers.*—These instruments are designed for technical purposes, and instead of indicating specific gravity the reading may give certain information which is proportional to specific gravity and derived from it by calculation. For example, the Brix instrument indicates the percentage of sugar in sugar-cane juice.

Albuminometer (al-bū-mi-nom′e-tėr).—A hydrometer used to indicate albuminuria. It is synonymous with Urinometer.

Alcoholometer (al″kō-hol-om′e-tėr).—A hydrometer for determining the percentage, either by weight or by volume, of alcohol in a spirituous solution.

Alcohometer (al-kọ̄-hom′e-tėr), *Alcoometer* (al-kọ̄-om′e-tėr).—Contracted forms of the word alcoholometer.

Elæometer (el-ọ̄-om′etėr).—A hydrometer used for testing the purity of oils, especially olive and almond oils.

Elaiometer (el-ạ̄-om′e-tėr).—Same as Elæometer.

Galactometer (gal-ak-tom′e-tėr).—A hydrometer graduated to show the percentage of added water in milk.

Gay Lussac's Hydrometer.—Similar to Tralles'.

Saccharometer (sak-a̤-rom′e-ter).—A hydrometer graduated to show the percentage of sugar in a saccharine solution.

Tralles' Hydrometer.—An alcoholometer graduated to show the percentage of ethyl alcohol by volume in a liquor. It is used by the United States Government and by distillers in gauging spirituous liquids.

Twaddell's Hydrometer.—A hydrometer for liquids heavier than water and, like the Baumé hydrometer, it is used principally in manufacturing operations. To convert its readings into specific gravity, multiply them by 0.005 and add 1.000 to the product. Thus, a reading of 40° Tw., $40 \times 0.005 = 0.200$ and $1.000 + 0.200 = 1.20$, the specific gravity which corresponds to 40° Tw.

Urinometer (ū-ri-nom′e-tėr).—A hydrometer used to determine the specific gravity of urine. The stem of the instrument is very slender and usually divided into 60 spaces. Each of these spaces represents a variation in specific gravity of one in the third decimal place; thus a reading of 22 or 23 indicates a normal urine of specific gravity 1.022 or 1.023.

II. WEIGHT VARIABLE. VOLUME OF LIQUID DISPLACED CONSTANT

Hydrometers of this type are provided with a short stem carrying a small pan at the upper end. Sufficient weights are placed on this pan to sink the hydrometer to the point indicated by a single mark on the stem. As the weight of the instrument is known, the required specific gravity is calculated from the value of the weights used.

Examples of this type of instrument are Fahrenheit's hydrometer and Nicholson's hydrometer. Nicholson's hydrometer is provided with a receptacle at the lower end so that it may be used in determining the specific gravity of solids as well as of liquids.

III. WEIGHT VARIABLE. VOLUME OF LIQUID DISPLACED VARIABLE

Hydrometers of this type are provided with a small receptacle in which a definite volume of liquid can be inclosed. The instrument is then floated in water and the specific gravity of the inclosed liquid is indicated by the mark on the stem at the surface of the water.

Examples of this type of instrument are Eichhorn's areopicnometer, Rousseau's densimeter, and Failyer's hydrometer. The last named instrument is designed for taking the specific gravity of minerals.

Sike's Hydrometer or Alcoholometer.—This instrument is used in England. It is provided with a series of weights which are to be added to the bottom of it until it sinks sufficiently to enable a reading to be made on the stem. A single instrument is thus made to do the work of a set of several. The percentage of alcohol is obtained by reference to a table which accompanies the instrument.

IV. WEIGHT CONSTANT. VOLUME OF LIQUID DISPLACED CONSTANT

Hydrometers of this class are reduced to mere bulbs having their specific gravities either engraved on them or else indicated by numbers. When several are thrown into a liquid the one having the same specific gravity as the liquid will float indifferently, and the specific gravity is thus readily ascertained.

Examples of this type of instrument are Lovi's beads and specific gravity beads in general.

Specific Gravity Balance.—This balance differs essentially from the ordinary type of balance in having at least one of the scales at the end of the beam replaced by a plummet. This plummet, for convenience, should be a short glass thermometer suspended by a slender platinum wire. When the plummet is immersed in a liquid, the weight required to restore the equilibrium indicates the specific gravity of the liquid. Instruments of this type are recommended for accuracy and rapidity. Mohr, Mohr-Westphal, and Reimann balances are on the market. The Mohr-Westphal balance is recommended on page liii of the United States Pharmacopœia VIII.

The most accurate determinations of specific gravity are made with the picnometer. The Sp. Gv. balance ranks next and the hydrometer third in point of accuracy.

The most rapid determinations are made with the hydrometer. The Sp. Gv. balances rank next, and the picnometer third.

Specific Volume.—The specific volume of a substance is the reciprocal of its specific gravity, and may be defined as the quotient which is obtained by dividing the volume of the substance by the volume of an equal weight of water. It, therefore, represents the number of unit volumes of the given substance which are necessary to equal the weight of one unit volume of standard substance.

HEAT

Definition.—Heat is that form of energy which gives rise to the well-known sensations of warmth and cold. It results from the vibratory motion of the molecules of matter.

Heat is produced, for pharmaceutic purposes, most conveniently by combustion, a rapid form of the chemical action known as oxidation.

Heat is measured for both intensity and quantity. The more rapid the rate of combustion, the greater the intensity. It is measured with the thermometer and expressed in degrees. (See page 42.)

The quantity of heat depends upon the amount of fuel consumed and is expressed in calories.

A **calorie** is defined as the amount of heat necessary to raise 1 gm. of water 1 degree Centigrade or from a temperature of zero to 1 degree Centigrade.

Latent Heat.—Heat which is required in changing the state of a body but not in changing its temperature. This is generally spoken of as "latent heat of fusion" and as "latent heat of vaporization." Thus 80.02 calories are absorbed when 1 gm. of ice at 0° C. is converted into water at 0° C. This explains why ice is such a good refrigerating agent. Conversely, when 1 gm. of water at 0° C. is converted into ice at 0° C., 80.02 calories must be abstracted. This explains why water tends to keep neighboring objects from freezing on cold nights.

When 1 gm. of water at 100° C. is converted into steam at 100° C., 536.6 calories are absorbed. This explains why it requires so much more heat to keep a water bath "boiling" vigorously than to keep the water in it at 100 degrees without boiling. Conversely, when 1 gm. of steam at 100° C. is converted into water at 100° C., 536.6 calories must be abstracted. This explains the efficiency of "steam heat" and also why so much water is necessary to "condense steam."

Specific Heat.—The quantity of heat necessary to raise 1 gram of a substance through 1° C. at any temperature is the specific heat of that substance at that temperature. The specific heat of water is unity (at the temperature at which the calorie is defined).

Fuels are substances which are intended to furnish heat through oxidation. They may be classified as follows: I. Solid, as wood and charcoal, and coal and coke. II. Liquid, as alcohol, kerosene and gasoline. III. Gaseous, as natural gas (chiefly methane, CH_4) and various forms of artificial gas. Gaseous fuels are the most convenient for pharmaceutic purposes by reason of the great variety of temperatures which may be obtained and the ease with which they may be manipulated. It is necessary that the oxidation be complete, and to secure this special contrivances are used, called burners. The best known of these are called Bunsen burners. They may be had in great variety of size and shape. The amount of heat that can be obtained from any given amount of fuel is constant. The temperature or intensity of heat is dependent upon the rate of oxidation.

Blast lamps are burners which are so constructed that the greatest amount of fuel can be consumed in the shortest time, and, on this account, they are used in securing high temperatures.

Bunsen Burner.—A burner invented by the distinguished German chemist, Bunsen. The special feature is the admission of the gas in a small jet at the base of a tube in such a way that it mixes with air and burns at the top of the tube with an intensely hot, colorless flame.

Water-bath.—A shallow metallic or porcelain basin to hold water, used in various pharmaceutic operations for the purpose of distributing the heat evenly over the bottom of a vessel. For convenience the basin is usually provided with a cover which consists of a series of concentric rings. The bath should also be provided with a water regulator to insure a constant supply of water to the bath to replace that lost by vaporization. Such a bath is called a constant-level water-bath. The water-bath is particularly useful in restricting the temperature to 100° C., the boiling-point of water. Lower temperatures must be secured by careful regulation of the heat supplied to the bath. When the basin is partially filled with oil, glycerin, paraffin, etc., for the purpose of distributing the heat, it is called an oil-, glycerin-, paraffin-bath, etc., respectively. When a temperature above 100° C. is desired the oil-bath (cottonseed oil) is perhaps the most desirable, and it may be used for any temperature up to 200° and even 250° C. It should be remembered that the temperature of an oil-bath must be controlled by regulating the supply of heat to the bath.

Sand-bath.—A shallow iron basin in which a thin layer of sand is placed, used to distribute the heat over the surface of the vessel which is being heated.

Wire cloth and **asbestos paper** may frequently be made to serve the same purpose as the sand-bath. Asbestos, although a poor conductor of heat, possesses a compensating advantage in that, when wet, it may be readily molded to fit the vessel.

Heat is regularly used in the following pharmaceutic operations and processes:

Calcination
Carbonization
Deflagration
Desiccation
Digestion
Distillation in all forms
Evaporation
Exsiccation
Fusion
Ignition
Incineration
Infusion
Sublimation
Torrefaction
Vaporization

Heat is occasionally used in the following:

Clarification
Concentration
Granulation

Heat is regularly used in the following classes of official preparations:

Cataplasmata
Cerata
Decocta
Emplastra
Extracta
Fluidextracta
Glycerita
Infusa
Oleata
Oleoresinæ
Resinæ

Heat is occasionally used in the following:

Aceta
Aquæ
Confectiones
Elixiria
Liquores
Massæ
Mellita
Mucilagines
Spiritus
Syrupi
Tincturæ
Unguenta

THERMOMETRY

Origin.—Gr. *therme*, heat + *metria*, from *metron*, measure.

Definition.—The art of measuring temperature.

Boiling-point.—See *Ebullition*, page 57.

For the various methods used in determining the boiling-point of liquids the student is referred to works on chemistry.

For pharmaceutic purposes and for testing the accuracy of the thermometer it is customary to place about 10 mils of the liquid in a 50-mil, long-necked flask, and add a small piece of pumice or porous plate to insure free ebullition. Then freely suspend the thermometer in the flask in such a way that its bulb is about 5 mm. above the surface of the liquid and heat the liquid to boiling with a small gas flame. Record, as the boiling-point of the liquid, the temperature at which the mercurial column remains stationary. To guard against superheating the vapor in the flask see that a drop of the liquid hangs constantly from the bulb of the thermometer. Liquids whose vapors are inflammable, as ether, alcohol, etc., should be heated in such a way as to prevent the vapors from reaching the flame, as near a chimney opening.

Freezing-point.—The temperature at which a liquid substance solidifies. It is also called the *congealing-point.*

The freezing-point of most substances is very nearly a constant, and, unlike the boiling-point, pressure has but little effect upon it. It may be stated that for substances like paraffin, which contract when they congeal, increasing the pressure raises their melting-point. For substances which expand when they congeal increasing the pressure lowers their melting-point. Thus, with water, increasing the pressure one atmosphere (760 mm.) would lower the melting-point 0.0075° C.; hence, like the boiling-point, it may be used as a means of identification or of detecting adulteration.

To determine the freezing-point, place, in a test-tube, a sufficient quantity of the substance to cover the bulb of a thermometer. Place the tube in a freezing mixture and stir the substance with the thermometer. Record, as the freezing-point, the temperature at which the mercurial column remains stationary during the solidification.

A freezing mixture composed of salt and crushed ice in the proportion of 1 part of salt by weight to 3 parts of ice will produce a temperature of from —18° to —22° C. Crystallized calcium chloride and powdered ice in the proportion of 10 to 7 will produce a temperature of about —55° C.

Melting-point.—The temperature at which a solid substance changes to a liquid, also called the *fusing-point.* This is the reverse of the freezing-point, and, although not always identical with it in temperature, its determination may be utilized for similar purposes. For various methods of ascertaining it the student is referred to works on analytic chemistry.

For most purposes the following methods will be found sufficiently accurate: Place in the bottom of a capillary tube[1] the finely powdered substance to a depth of about 3 mm. and jar it down compactly. Then fasten the tube to a thermometer with a small rubber band (a segment of a small rubber tube), so that the substance is opposite the center of the lower third of the thermometer bulb. Immerse the bulb of the thermometer completely in cottonseed oil contained in a small beaker. Heat the oil slowly, stirring constantly, until the substance melts. Record, as the melting-point, the temperature at which the column of mercury remains stationary during the liquefaction.

The melting-point of waxes and similar substances may be conveniently taken as follows: Smear the bulb of the thermometer with the fused substance and allow it to congeal. (For some substances it is best to let it set for from twelve to twenty-four hours.) Then place the thermometer bulb in a beaker of water and heat slowly. Record, as the melting-point, the temperature at which the wax fuses and globules rise to the surface of the water.

Thermometers.—*Origin.*—Gr. *therme,* heat + *metron,* measure.

Definition.—Instruments for measuring temperatures. The mercurial thermometer is the one generally used by pharmacists. It consists of a slender glass tube with a capillary bore, having a bulb at one end. The bulb and part of the capillary tube is filled with mercury. Variations in temperature cause the mercury to expand or contract and thus lengthen or shorten its column in the capillary tube. To facilitate the measurement of the length of the column of mercury the capillary tube is graduated throughout its length into equal spaces. Fahrenheit was the first to reduce this graduation to a system. It is claimed that for the zero of his scale he adopted the lowest temperature observed in the winter of 1709, and for the upper fixed point the temperature of the human body, considered by him as 96°. By this system of graduation the two definite temperatures of nature, the melting-point of ice and the boiling-point of water, were fixed at 32° and 212° respectively.

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[1] The capillary tubes may be prepared by heating to redness a piece of an ordinary thin-walled glass tubing of about 4 mm. diameter and drawing it out into a tube of about 1 mm. internal diameter. Cut it into lengths of about 5 cm. and seal one end in the flame.

Three thermometric scales are in common use in stating temperatures, known by the names of their inventors, Fahrenheit, Celsius, and Réaumur.

Fahrenheit Thermometer.—This instrument is in common or domestic use in English-speaking countries. The melting-point of ice is 32° F., and the boiling-point of water is 212° F.

Centigrade or Celsius Thermometer.—This instrument is in general use in most Continental countries, and for scientific purposes the world over. Temperatures in the United States Pharmacopœia are stated in terms of this instrument. The melting-point of ice is 0° C., and the boiling-point of water 100° C.

Réaumur (Rā-ō-mür′) *Thermometer.*—This instrument, formerly used in Germany and Russia, is almost entirely superseded by the Centigrade instrument. The melting-point of ice is 0° R., and the boiling-point of water 80° R.

Proving.—For methods of proving the thermometer the student is referred to works on physics.

The United States Bureau of Standards at Washington, D. C., will prove thermometers and issue certificates.

The simplest way of proving a thermometer is to compare it with a standard instrument, but if the fixed points (the freezing- and boiling-points of water) are correct the instrument may be considered sufficiently accurate for most purposes.

To test the freezing-point, immerse the bulb of the instrument in pure crushed ice. The column of mercury should recede to the proper degree on the instrument. To test the boiling-point, proceed as directed under *Boiling-point,* page 40. As the boiling-point varies with the atmospheric pressure (the greater the pressure, the higher the boiling-point, and conversely), the reading of the barometer should be noted. The standard pressure is 760 mm. of mercury, and a variation of 27 either way will vary the boiling-point, approximately, 1° C. in the same direction. (For greater variations than 27 mm. the student should consult specially prepared tables. See Landolt and Bornstein, Physikalchemische Tabellen, and page 57.)

Temperature.—The degree or intensity of the sensible heat of a body.

Gentle Heat.—This temperature is defined in the U. S. P. as any temperature between 32° and 38° C.

Hot.—85° to 95° C.

Lukewarm.—Same as *Tepid.*

Moderate Heat.—45° to 50° C.

Ordinary Temperature.—15° to 25° C.

Scalding.—About 85° C.

Tepid.—35° to 40° C.

Warm.—60° to 70° C.

PHARMACEUTIC PROCESSES AND TERMS DEFINED

Bruising.—*Definition.*—The process of softening vegetable substances or of rupturing their cell walls by pounding, but without necessarily reducing the drug to small particles. Compare *Contusion*, page 48.

Example.—Fresh herbs are usually bruised previous to extraction.

Calcination (kal-si-nā'sho̤n).—*Origin.*—L. *calcinatio*, from *calx*, lime.

Definition.—The process of strongly heating inorganic substances for the purpose of expelling all volatile matter, especially carbon dioxide and combined water, thus reducing them to a friable condition resembling lime.

Example.—Lime and magnesia are derived from their respective sources, calcium carbonate and magnesium carbonate, by calcination.

Carbonization (kär″bo̤-ni-zā'sho̤n).—*Origin.*—L. *carbonize*, from *carbo*, coal.

Definition.—The process of strongly heating organic substances without access of air until all volatile matter has been expelled and the residue has assumed the characteristic appearance of carbon or charcoal.

Example.—This process is used in preparing charcoal and coke from their respective sources, wood and coal.

Products.—*Charcoal.*—The residue obtained from the carbonization of wood.

Animal Charcoal (*Bone Char*).—The residue obtained from the carbonization of animal matter, such as bones, blood, etc.

Coke.—The residue obtained from the carbonization of bituminous coal.

Circulatory Solution or Circulatory Displacement.—*Definition.*—A process of dissolving or of extracting substances by suspending them in the upper stratum of the solvent or menstruum.

It is a rapid and convenient method for securing the solution of slowly soluble substances.

Procedure.—The substance to be dissolved or extracted is suspended just below the surface of the liquid in a cloth bag, wire basket, or such other receptacle as will allow free contact with the solvent. The solvent liquid, upon becoming saturated, is denser and sinks to the bottom of the vessel, thus forcing the less saturated portions of the liquid upward to take its place. Automatic agitation is thus secured, and the process goes on without attention or interruption until all soluble matter has gone into solution or until the solvent liquid has become saturated.

Clarification (klar″i-fi-kā′shọn).—*Origin.*—L. *clarus*, clear + *facere*, to make.

Definition.—The process of removing from liquids such insoluble substances as interfere with their transparency by means other than filters or strainers.

The insoluble matter which is removed by clarification is usually of such a character that it will either pass through the pores of the closest filter-paper or else clog them.

Example.—This process is used in preparing the clarified honey of the United States Pharmacopœia.

Procedures.—1. *Clarification by the Application of Heat.*—Heat not only increases the fluidity of the liquid, but brings about a sort of coagulation of the insoluble particles in it, so that they separate out at the top as a scum or else at the bottom as a sediment.

2. *Clarification by Increasing the Fluidity of the Liquid.*—This is done either by diluting the liquid or else by heating it. This method is slow and of limited application.

3. *Clarification by Sedimentation.*—The liquid is allowed to remain without agitation until the insoluble particles settle to the bottom.

4. *Clarification by Use of Paper Pulp.*—Purified paper pulp is thoroughly mixed with the liquid and allowed to remain for several hours. Heat is sometimes applied. The fibers of the paper pulp envelop the other insoluble particles and both are removed at the same time by appropriate methods.

5. *Clarification by Fermentation.*—In this process the nature of the liquid gradually changes from saccharine to alcoholic, and the insoluble particles either settle to the bottom or else are carried to the top by the escaping bubbles of carbon dioxide.

6. *Clarification by the Use of Albumin.*—The albumin is beaten to a froth and thoroughly mixed with the cold liquid. The mixture is then heated slowly to boiling. The coagulated albumin, rising to the top, carries with it the insoluble particles. They are usually removed by skimming. The white of one egg is usually sufficient for a gallon of liquid.

7. *Clarification by the Use of Gelatin, Isinglass, Glue, Milk, etc.*—This method is applicable when the turbidity is caused by tannins. The tannins unite chemically with these clarifying agents and render them insoluble. These agents should not be used in excess.

Cohobation (kō-họ-bā′shọn).—*Origin.*—L. *cohobatio,* from *cohobare,* redistil.

Definition.—A process of distillation in which the distillate is repeatedly returned to the still.

Example.—This process is resorted to in the distillation of certain expensive volatile oils, as oil of rose.

Procedure.—In the preparation of certain volatile oils by distillation with water, when the percentage of oil is small, it is frequently insufficient to saturate the first distillate. This distillate is, therefore, returned repeatedly to fresh portions of the plant in the still until it becomes sufficiently supersaturated for the oil to separate.

Colation (kọ̄-lā′sho̤n).—*Origin.*—L. *colatio,* from *colare,* to strain.

Definition.—The process of separating solids from liquids by pouring the mixture upon some porous medium, such as cloth, felt, wire cloth, etc., the pores of which are too minute to permit the passage of the solid particles.

Example.—This process is used in removing the drug particles from an infusion or decoction.

Apparatus.—*Colander.*—A utensil, usually metallic, with a perforated bottom, used in straining.

Hippocrates' Sleeve.—A conical straining bag made from heavy cotton flannel or from felt.

Strainers.—Porous media used in colation or straining. They differ from filters in that they have larger pores.

Tenaculum.—A square frame with a sharp spike in each corner, used especially to support cloth strainers.

Comminution (kom-i-nū′sho̤n).—*Origin.*—L. *con* = cum + *minuere,* to break into small pieces.

Definition.—A general term implying the reduction of substances to particles.

Procedure.—For pharmaceutic purposes this reduction may be accomplished by some one of the following processes:

1. Contusing.
2. Crushing.
3. Cutting.
4. Granulating.
5. Grating.
6. Grinding.
7. Levigating.
8. Precipitating.
9. Pulverizing.
10. Rasping.
11. Slicing.
12. Triturating.

Concentration (kon-sen-trā′sho̤n).—*Origin.*—L. *concentratio,* from *concentrare,* to bring together.

Definition.—The process of increasing the strength or potency of any preparation by removing the inert or useless material, especially that of a volatile character, as in the removal of the solvent liquid by evaporation.

Condensation (kon-den-sā′sho̤n).—*Origin.*—L. *con,* together + *densare,* make thick.

Definition.—The process of converting steam or vapor into a liquid or solid.

Example.—The converting of steam into water, or of sulphur vapor into flowers of sulphur.

Apparatus.—*Condenser.*—Any apparatus for receiving and condensing the vaporized substances, through the removal of the heat of vaporization.

Liebig's Condenser.—This is the type of condenser most familiar to the chemist and pharmacist. It consists of a tube for the entrance of the vapor, surrounded by another tube or "jacket" through which a stream of water is kept flowing to abstract the heat from the vapor. The vapor, thus deprived of its latent heat, liquefies and flows from the exit end of the inner tube of the condenser.

Contusion (kọn-tū′zhọn).—*Origin.*—L. *contusio*, from *contusus*, bruise.

Definition.—The process of bruising a substance by striking it a succession of blows.

Example.—Vegetable substances are pounded previous to extraction when it is desired to rupture the cell walls without necessarily reducing the substance to particles (bruised). Large crystals are also comminuted by pounding them in an iron mortar with the pestle.

Crushing (krush′ing).—*Origin.*—L. *cruscire*, crack, break.

Definition.—The process of destroying the natural shape of a substance by submitting it to violent pressure. Friable substances will, by this means, be comminuted.

Example.—Pulpy substances are crushed by passing them between heavy rollers.

Crystallization (kris″ta̤-li-zā′shọn).—*Origin.*—L. *crystal*, crystal + *ize* + *ation*, to form.

Definition.—The process whereby a chemical compound under the action of its intermolecular forces assumes a regular polyhedral form bounded by plane surfaces. This change most frequently takes place when the substance passes from the gaseous or liquid form into that of a solid.

Procedure.—Crystals are usually deposited when a saturated solution is allowed to cool, also when the solvent liquid is slowly removed from a saturated solution by evaporation.

Apparatus.—*Crystallizing Dishes.*—Relatively shallow glass dishes having flat bottoms and perpendicular sides.

Definition of Terms.—Amorphous.—The term applied to solid substances which do not possess the characteristics of crystalline structure. *Examples:* Tannic acid, prepared chalk.

Angles.—The points formed by the intersection of three or more faces.

Axes.—Imaginary lines passing through the center of a crystal, assumed for convenience in defining the position of the faces and to exhibit the symmetry of the crystal.

Cleavage.—The tendency of a crystal to break or split parallel to certain faces or planes, well illustrated with calcite.

Clinometric.—A term signifying that the axes of a crystal intersect each other at oblique angles.

Colloid.—A non-crystallizable substance resembling glue or jelly. See *Dialysis*, page 54.

Crystal.—A regular polyhedral form bounded by plane surfaces, formed by the action of intermolecular forces ordinarily, while a substance is passing from the state of a liquid or gas to that of a solid.

Acicular Crystals.—Those occurring in needle-like forms. *Examples:* Aloin, menthol.

Laminar Crystals.—Those occurring in thin plates. *Examples:* Acetanilid, beta-naphthol.

Prismatic Crystals.—Those occurring in forms resembling prisms. *Examples:* Potassium permanganate, magnesium sulphate.

Tabular Crystals.—Those occurring in flat plates. *Examples:* Potassium chlorate, silver nitrate.

Crystallogeny.—The art of producing crystals, including the theories of their origin and nature.

Crystallography.—See page 18.

Crystalloid.—A crystallizable substance. See *Dialysis*, page 54.

Decrepitation.—The crackling noise accompanying the flying asunder of the parts of various salts and minerals when heated. It is caused by their unequal rate of expansion or by the sudden vaporization of water or other liquid held mechanically within them. *Example:* Sodium chloride decrepitates when heated.

Deliquescence.—See page 53.

Dimorphous.—A term signifying that the crystals of a substance occur in two distinct forms. *Example:* Calcium carbonate.

Edge.—The intersection of two adjoining faces.

Efflorescence.—See page 58.

Faces.—The plane surfaces bounding a crystal.

Hemihedral.—A term signifying the presence of only half the number of faces required for full symmetry.

Holohedral.—A term signifying the presence of all the faces required for full symmetry.

Hygroscopic.—See page 65.

Interstitial Water.—Water of decrepitation. Water which is held mechanically within crystals or minerals.

Isomorphous.—A term signifying that two or more substances crystallize in the same form. *Examples:* Sodium chloride and sodium iodide, magnesium sulphate and zinc sulphate.

Mother Liquor.—The term applied to the saturated solution from which crystals have separated.

Plane.—One of the natural faces of a crystal.

Polymorphous.—A term signifying that the crystals of a substance occur in two or more distinct forms.

Prism.—A form bounded by planes, usually four, six, eight, or twelve, which are parallel to the vertical axis.

Pyramid.—A form whose planes cut all three axes.

Recrystallization.—The process of subjecting a chemical to repeated crystallizations for the purpose of purification. This process is used especially in connection with the purification of substances such as salicylic acid, oxalic acid, etc.

Trimorphous.—A term signifying that the crystals of a substance occur in three distinct forms. *Example:* Titanium dioxide.

Water of Constitution.—Water which is in more intimate connection with the chemical properties of the salt than water of crystallization, and requiring a higher temperature for its expulsion. It is not generally expelled below 100° C.

Water of Crystallization.—Water which is held by certain salts as a necessary part of their crystalline structure. It is loosely combined chemically and does not render the crystal moist, though it may constitute more than 50 per cent. of the actual weight. In chemical formulæ it is indicated thus:

$Na_2B_4O_7 + 10H_2O$. $10H_2O$ or 10Aq. is the water of crystallization.

Systems of Crystallization.—The 32 possible groups, distinguished by their symmetry, are classified by crystallographers, generally, in six systems, each characterized by the relative lengths and inclinations of the axes. They are as follows:

I. *Isometric System,* also called Regular, Cubic, Monometric, Tesseral, and Tessular System: Three equal axes, all at right angles. The fundamental forms are the cube and the regular octahedron. *Examples:* Sodium chloride, potassium iodide, potassium bromide.

II. *Tetragonal System,* also called Dimetric, Quadratic, Pyramidal, Monodimetric, Quartenary, and Square Prismatic System: Three axes, two equal, the third longer or shorter, all at right angles. The fundamental forms are the right-square prism and the quadratic octahedron. *Example:* Potassium ferrocyanide.

III.—*Hexagonal System,* also called Rhombohedral and Monotrimetric System: Four axes, three equal, in one plane intersecting at equal angles; the fourth axis at right angles to the other three, and longer or shorter. The fundamental forms are the hexagonal prism and the double hexagonal pyramid. *Examples:* Iodoform, sodium nitrate, strontium bromide.

IV. *Orthorhombic System,* also called Rhombic, Prismatic, and Trimetric System: Three unequal axes, all at right angles. The fundamental forms are the rhombic prism and the rhombic octahedron. *Examples:* Magnesium sulphate, zinc sulphate, potassium and sodium tartrate.

V. *Monoclinic System,* also called Oblique, Hemiprismatic, Monoclinohedral, Clinorhombic, and Monosymmetric System: Three unequal axes, two obliquely inclined to each other, the third at right angles to these two. The fundamental forms are the monoclinic prism and the monoclinic octahedron. *Examples:* Ferrous sulphate, potassium chlorate, borax, sodium thiosulphate.

VI. *Triclinic System,* also called Asymmetric, Double Oblique, Triclinohedral, Clinorhomboidal, and Amorthic System: Three unequal axes, with mutually oblique intersections. The fundamental forms are the triclinic prism and the triclinic octahedron. *Examples:* Copper sulphate, potassium dichromate.

Decantation (dē-kan-tā'shọn).—*Origin.*—L. *de,* down + (probably) *canthus,* side, corner.

Definition.—The process of pouring a liquid from a subsided solid, or from one vessel to another.

When it is especially desired to leave the solid matter undisturbed or when the vessel is very large, a syphon may be used to advantage. Decantation is especially indicated when bulky precipitates are to be washed or when a large volume of wash water is unobjectionable.

Example.—This process was officially used in the preparation of ferric hydroxide and iodide of mercury, U. S. P. VIII.

Decoction (dẹ-kok'shọn).—*Origin.*—L. *de,* from + *coquere,* cook, boil.

Definition.—The process of extracting the desired principles of drugs by boiling them in water.

Example.—The beverage, coffee, is usually prepared by this process. This process is adapted to the extraction of the hard parts of the plants, such as wood, roots, rhizomes, etc., whose medicinal principles are soluble in water and not dissipated or injured by the heating. See also *Decoctions,* page 295.

Decoction.—The solution containing the medicinal principles derived from the drug by the process of decoction.

Decoloration (dē-kul″ọ-rā'shọn).—*Origin.*—L. *de,* from + *color,* color.

Definition.—The process of removing the color from a substance. It is usually accomplished by employing oxidizing or reducing agents to destroy the coloring-matter; by precipitation with basic acetate of lead; and by absorption with animal charcoal.

Animal charcoal is frequently used to decolorize pharmaceutic preparations, but it should be used with discretion because it also absorbs many alkaloids, glucosides, and bitter principles.

Deflagration (def-lạ-grā'shọn).—*Origin.*—L. *deflagratio,* from *deflagrare,* to burn up.

Definition.—The process of oxidizing substances so rapidly as to cause flame and detonation.

Procedure.—The substance to be deflagrated is mixed with a chemical capable of yielding oxygen, a nitrate or a chlorate, and then projected in small portions into a red-hot crucible.

Deliquescence (del-i-kwes'e̤ns).—*Origin.*—L. *de,* down + *liquere,* melt, to melt down.

Definition.—The property, possessed by certain chemical compounds, of liquefying through absorption of moisture from the air. Substances possessing this property are said to be deliquescent. They should be carefully protected from the air.

Deliquescent Substances:

Ammonium Valerate.
Calcium Bromide.
Calcium Chloride.
Chromium Trioxide.
Ferric Chloride.
Gold and Sodium Chloride.
Iron and Ammonium Citrate.
Iron and Quinine Citrate.
Hyoscyamine Hydrobromide.
Lithium Bromide.
Lithium Citrate.
Potassium Acetate.
Potassium Carbonate.
Potassium Citrate.
Potassium Cyanide.
Potassium Hydroxide.
Potassium Hypophosphite.
Sodium Arsenate
(in moist air).
Sodium Cacodylate.
Sodium Cyanide.
Sodium Hydroxide.
Sodium Hypophosphite.
Sodium Iodide.
Sodium Nitrite.
Sodium Thiosulphate
(in moist air).
Strontium Bromide
(in moist air).
Strontium Iodide.
Zinc Chloride.

Desiccation (des-i-kā'sho̤n).—*Origin.*—L. *desiccatio,* from *desiccare,* dry up.

Definition.—The process of depriving substances of moisture, drying.

Example.—The drugs thyroid and suprarenal glands of the U. S. P. are prepared by desiccation.

Procedure.—The substances are usually exposed to a current of warm air. The temperature may range from 40° to 200° C., but for most organic medicinals the temperature should not exceed 40° C. unless it is positively known that a higher temperature is unobjectionable.

Drugs whose active principles are volatile, or are easily injured by heat, suffer considerable loss during desiccation. The following of this class are deserving of special mention: *Aro-*

matic drugs, like cardamom, cinnamon, cloves, nutmeg, etc.; certain *gum-resins* and *resins,* like ammoniacum, asafetida, and myrrh, and certain *alkaloidal* and *glucosidal drugs,* such as conium, aconite, and digitalis.

Objects.—To reduce bulk, to aid in preservation, and to facilitate comminution.

Bibulous Paper.—A thick, unsized paper (blotting-paper), used for drying crystals and precipitates.

Dialysis (dī-al'i-sis).—*Origin.*—Gr. *dia,* through + *lysis,* a loosing.

Definition.—The process of separating soluble crystalline substances (crystalloids), from glue-like substances (colloids) by taking advantage of the unequal rate of diffusion through natural or artificial membranes.

Example.—Dialysed iron is prepared by this process. See *Dialysates,* page 446.

Procedure.—The liquid containing the substance to be separated is placed in a parchment-paper bag or a dialyser and floated in distilled water. The crystalloids pass through the moist membrane into the surrounding water very readily; the colloids remain behind.

Dialyser.—A shallow vessel with a bottom of parchment paper or animal membrane, used in dialysis.

Dialysate.—The product removed from a solution by dialysis. The term "dialysate" is usually restricted to the liquid containing the colloids which remains in the dialyser.

Dialysates.—See page 446.

Diffusate.—The solution containing crystalloid substances which have been removed by dialysis.

Diffusion (di-fū'zhọn).—*Origin.*—L. *dis,* away + *fundere,* pour.

Definition.—A process of extraction which consists of remaceration. It is used principally in the extraction of sugar from sugar-cane and the sugar beet, and is carried out in a manner similar to *Repercolation,* see page 71.

Diffusion, when applied to fluids, refers to the spontaneous molecular mixing which occurs when they are placed in contact one with the other.

Digestion (di-jes'tyọn).—*Origin.*—L. *dis,* apart + *gerere,* to carry.

Definition.—A process of partial extraction wherein the substance is allowed to remain in contact with the menstruum at an elevated temperature for a considerable time. The temperature, unless otherwise indicated, usually ranges from 38° to 45° C.

Displacement Washing.—See *Lotion*, page 67.

Distillation (dis-ti-lā′shọn).—*Origin.*—L. *de*, from + *stillare*, to drop.

Definition.—A process of separation which consists in vaporizing the liquid and subsequently condensing the vapor.

Example.—Water is freed from mineral impurities by distillation, as in the preparation of the official distilled water.

Apparatus.—*Adapter.*—A tube (usually of glass) with ends differing in size, used to connect two other tubes or pieces of apparatus.

Alembic.—An ancient form of distillatory apparatus, usually made of copper or glass. It consisted of a gourd-shaped bottom part for the reception of the liquid, surmounted by a dome-like condensing chamber.

Capitol.—The condensing chamber of an alembic; the dome or head.

Condenser.—See *Condensation*, page 48.

Cucurbit.—The body or boiling chamber of an alembic.

Grommet.—A ring of rope, rubber tubing, or straw, used to support a round-bottomed flask, or to keep a heated glass vessel from contact with a cold surface.

Helm.—The tube leading from condensing chamber of an alembic.

Retort.—A flask-shaped vessel, used in distilling, which has a long tapering neck bent at an acute angle with the body of the flask. Retorts are usually made of glass, but may also be made of either metal or porcelain. Retorts which have an opening in the top through which the substance may be introduced are called tubulated retorts, and the short tube-like opening is known as a tubulure.

Still.—The complete distillatory apparatus—boiler, condenser, and sometimes the receiver.

Worm.—A term applied to a condenser which consists of a coil of tubing, usually of copper or tin, placed in a jacket of running water.

Terms, Etc.—*Bumping.*—The sudden explosion caused by the formation of vapor in a superheated liquid. Bumping is especially liable to happen when liquids are boiled in glass vessels. It is frequently prevented by adding a few pieces of freshly ignited pumice or unglazed porcelain to the liquid before it is heated.

Distillate.—The product of distillation. The liquid which is collected in the receiver.

DESTRUCTIVE DISTILLATION.—*Definition.*—The process of distilling organic substances of complex composition at a temperature sufficient to resolve them into simpler compounds. The stills for this purpose must be made of a material which will withstand high temperatures, such as iron or porcelain.

Example.—Bituminous coal is subjected to destructive distillation in the preparation of illuminating gas.

DRY DISTILLATION.—*Definition.*—The process of distilling substances by themselves without the addition of water or other volatile substances (Distillation *per se*). Opposed to *Wet Distillation.*

FRACTIONAL DISTILLATION.—*Definition.*—The process of distilling a complex substance, the component parts of which have different boiling-points, for the purpose of separation. The distillate is collected in several portions or fractions.

Example.—Crude petroleum is separated by fractional distillation into gasoline, kerosene, lubricating oils, etc.

VACUUM DISTILLATION.—Distillation under diminished atmospheric pressure. Special apparatus, known as a "vacuum pan," is required. In general, this consists of a steam-jacketed kettle joined to a condenser which, in turn, is connected with a vacuum pump. Such an apparatus is especially desirable in concentrating percolates and other vegetable extracts which are liable to suffer injury by ordinary evaporation. For the reduction in the temperature of boiling due to partial vacuum see table, page 57.

WET DISTILLATION.—*Definition.*—The process of distilling substances with water or other volatile liquid. Opposed to *Dry Distillation.*

Example.—Many of the official volatile oils are prepared by this process. The drug is mixed with water and subjected to the process of distillation. The oil, vaporizing along with the water, is condensed with it, and the final separation takes place in a specially constructed receiver, known as a *Florentine receiver*.

Ebullition (eb-u-lish′o̤n).—*Origin.*—L. *ebullitio*, from *ebullire*, boil up.

Definition.—The bubbling (boiling) of a liquid caused by some disturbing force below its surface.

This term is ordinarily applied to the bubbling caused by the escape of vapor formed on the lower surface of the liquid by the application of heat. Compare *Effervescence*, page 58.

Boiling-point.—The temperature at which ebullition takes place in any particular liquid. Technically, it is the temperature at which the tension or the vapor of the substance equals the pressure of the atmosphere. The greater the pressure, the higher the boiling-point, hence increasing the pressure raises the boiling-point, whereas decreasing the pressure lowers the boiling-point.

Standard Atmospheric Pressure for Recording Boiling-points.—760 millimeters of mercury at 0° C., latitude 45°, and at sea level. This pressure is equivalent to that of a column of water about 34 feet high.

Such a pressure is called a pressure of one atmosphere.

In English units it amounts to approximately 14.7 pounds per square inch.

A change of pressure amounting to 27 mm. either way from the normal pressure of mercury (760 mm.) will change the boiling-point of water 1° C. from the normal (100° C.).

The following table shows the relation of the boiling-point of water to surface pressure:

Boiling-point, Centigrade. °	Pressure in mm. of mercury.	Boiling-point, Centigrade. °	Pressure in mm. of mercury.	Boiling-point, Centigrade °	Pressure in mm. of mercury.
0	4.6	70.0	233.10	150.0	3,582
5	6.5	80.0	354.60	152.2	3,800
10	9.2	90.0	525.40	159.2	4,560
20	17.4	100.0	760.00	165.4	5,320
25	23.6	(212.0 F.)	(14.69 lb.)	170.8	6,080
30	31.6	110.0	1075.00	175.8	6,840
40	54.9	120.6	1520.00	180.4	7,600
50	92.0	133.9	2280.00	200.0	11,664
60	148.8	144.0	3040.00		

Uses.—Knowledge of the boiling-point of a liquid is useful in establishing the identity of the latter, as well as in ascertaining its strength and purity.

Example.—Spirit of Nitrous Ether, which will not boil at 65° C., when a few small pieces of broken glass are added is probably deficient in strength. The United States Pharmacopœia invariably gives the boiling-point of liquids in cases where it will prove useful in establishing the identity, purity, or strength.

Effervescence (ef-ėr-ves′e̤ns).—*Origin.*—L. *effervescere,* foam up.

Definition.—That particular form of ebullition which is caused by fermentation or by chemical reaction, wherein the escaping bubbles of gas are very minute.

Example.—The disturbance caused by the addition of water to one of the Official Effervescent Salts. See page 385.

Efflorescence (ef-lǭ-res′e̤ns).—*Origin.*—L. *ex* + *florere,* blossom, from *flos*, flower.

Definition.—The formation of a whitish powder or rust on the surface of certain salts, occasioned especially by the loss of water of crystallization. Salts which part with their water of crystallization when exposed to the air at the ordinary temperature *effloresce* and are said to be *efflorescent.* Such substances should be carefully protected from the air.

Efflorescent Substances:

Atropine Sulphate.
Caffeine.
Calcium Lactate.
Codeine.
Copper Sulphate.
Ferric Ammonium Sulphate.
Ferrous Sulphate.
Ferrous Sulphate, granulated.
Lead Acetate
Magnesium Sulphate.
Potassium and Sodium Tartrate.
Potassium Ferrocyanide.
Sodium Acetate.
Sodium Arsenate.
Sodium Benzosulphinide.
Sodium Borate.
Sodium Citrate.
Sodium Phenolsulphonate.
Sodium Phosphate.
Sodium Pyrophosphate.
Sodium Sulphate.
Sodium Sulphite.
Sodium Thiosulphate
(in dry air).
Strontium Bromide
(in dry air).
Strychnine Sulphate.
Zinc Acetate.
Zinc Phenolsulphonate.
Zinc Sulphate.

Elutriation (ẹ̄-lū-tri-ā′sho̤n).—*Origin.*—L. *elutriatio*, probably from *elutriare*, wash out.

Definition.—(a) The operation of cleansing by washing and decanting. (b) A process known as "water sifting," by which the particles of an insoluble pulverized substance are separated into different grades of fineness by taking advantage of the fact that the smaller the particles of any substance, the more slowly they settle through a column of liquid.

Example.—Prepared chalk is purified and graded by this process.

Procedure.—The pulverized substance is agitated with water, and the coarser particles allowed to subside. The finer suspended particles are decanted with the water into another vessel and allowed to subside.

Magma.—A thick pasty mass composed of small particles. Compare with *Magma*, page 347.

Enfleurage (oṅ-flė-räzh′).—*Origin.*—Fr. from L. *in* + *flos*, flower.

Definition.—The process of extracting delicate odors from flowers by the use of inodorous fats.

Example.—The odors of Jasmine, Tuberose, Mignonette, etc., are extracted by this process.

Procedure.—The inodorous fats, spread in thin layers on suitable frames, are covered with the flowers, and allowed to remain until they are fully saturated. The spent flowers are replaced from time to time with fresh ones. For an interesting article see Amer. Jour. Pharm., xxix, page 551.

Pomades.—The term applied to the fats which have been saturated with perfume by enfleurage. Compare *Pomades*, page 447.

Evaporation (ẹ̄-vap-ọ̄-rā′sho̤n).—*Origin.*—L. *e*, out + *vapor*, vapor.

Definition.—A process of concentration wherein the volatile substances are removed in the form of vapor, or a process of separation by vaporization which has for its object the recovery of the less volatile substances.

Example.—Alcoholic liquids are removed from percolates by evaporation in the preparation of the Official Extracts and Fluidextracts. Evaporation, below the boiling temperature of the liquid, may be hastened by increasing the temperature, by increasing the surface exposed, by agitation, by directing a current of air across the surface, and by lessening the degree of saturation of the air.

Evaporating Dish.—A shallow, round-bottomed dish with sloping sides, usually made of porcelain, glass, or metal.

Spontaneous Evaporation.—Evaporation which takes place at the ordinary temperature or without resorting to artificial heat.

Example.—The last trace of the solvent liquid, in the preparation of the Official Oleoresins, is directed to be removed by spontaneous evaporation.

Expression (eks-presh′o̤n).—*Origin.*—L. *ex*, out + *premere*, to press.

Definition.—The process of forcibly separating a liquid from a solid.

This process is frequently used when the bulk of liquid to be separated is relatively small.

Example.—The preparation of Succus Pomorum of the N. F. Also in the preparation of the Peppermint and Spearmint Spirits of the U. S. P.

Procedure.—The substance to be acted upon is placed in a bag of coarse strong material, or in a perforated metallic cylinder, and pressure is applied by means of a suitable mechanical contrivance, called a press. For small pharmaceutic operations the screw press will be found most convenient. In many minor operations sufficient pressure may be obtained by twisting the cloth bag containing the substance.

Press.—A mechanical contrivance for the convenient application of the force necessary to bring about a reduction in the volume of a substance, or to separate the liquid from the solid matter. According to construction and the manner of applying the force presses are frequently designated by such terms as: Centrifugal, Hydraulic, Lever, Roller, Screw, Twist, Wedge, etc. In operating presses the following points should be observed:

(a) Keep the moving parts of the press well lubricated.

(b) Increase the pressure gradually to avoid sudden strains which may result in bursting the press cloth, or in forcing small particles of the solid through its meshes.

(c) Let the pressure be intermittent, but unrelaxed, allowing time between each increase of pressure for the liquid to escape and for the particles of the compressed substances to arrange themselves along the lines of the least resistance.

Press Cloth.—The coarse canvas used to envelop a substance which is to be pressed.

Marc.—The refuse solid matter remaining after the liquid portion has been expressed.

Exsiccation (ek-si-kā′sho̤n).—*Origin.*—L. *ex*, out + *siccus*, dry.

Definition.—The process of removing the water of crystallization by the application of heat.

Example.—Certain of the official salts are prepared by this process; as, Exsiccated Alum, Exsiccated Ferrous Sulphate, etc.

Object.—To increase the efficacy (astrigency) in Alum; to decrease the bulk in Ferrous Sulphate; to reduce to definite composition in Sodium Arsenate; to impart new properties in Calcium Sulphate.

Procedure.—Place the substance in a shallow vessel and heat gradually, to avoid, if possible, liquefying the substance in its water of crystallization. Continue the heating, stirring if necessary, until the required result is obtained. The temperature is a matter of importance and should be no higher than necessary. It usually ranges from 45° to 250° C., according to the nature of the salt. Efflorescent salts which contain large amounts of water of crystallization are best exposed to the air for several days before applying artificial heat, for only in this way is liquefaction avoided. The Exsiccation of Sodium Phosphate affords a good illustration of this fact.

Extraction (eks-trak′sho̤n).—*Origin.*—*ex*, out + *trahere*, draw.

Definition.—The general term for the removal of the soluble constituents of a drug by acting upon it with a liquid capable of dissolving them.

Object.—To separate the active principles of a drug from the great bulk of inert matter.

Procedure.—See one of the following methods:

1. Decoction.
2. Diffusion.
3. Digestion.
4. Infusion.
5. Lixiviation.
6. Maceration.
7. Percolation.

Menstruum.—The solvent liquid used with any process of extraction.

Extract.—A general term for the solution of the active principles of a drug. Compare *Extract*, page 305.

Extractive.—The general term for the solid matter which has been extracted from organic substances. This term is also applied to those constituents which are darkened in color and rendered more or less insoluble during the concentration of an alcoholic extract. It is also called *Apotheme.*

Filtration (fil-trā'shọn).—*Origin.*—L. *filtratio*, from *filtrare*, filter.

Definition.—The process of separating small insoluble particles from a liquid by passing it through filtering paper or other porous medium, called a filter. Cotton, sand, and charcoal are also used as filtering media.

Example.—Filtration is employed to remove the insoluble particles of talc in the preparation of the official waters. See page 283.

Filtering Press (*Filter Press*).—A mechanical contrivance for hastening filtration, wherein the liquid is forced, by means of specially constructed pumps, through the filtering medium. This process is particularly applicable when the amount of insoluble matter is relatively small.

Funnel.—A small, conical instrument used in small operations to support the filtering medium, and at the same time conduct the filtrate into the receiving vessel.

Funnels are made of glass, hard rubber, porcelain, enameled iron, copper, brass, and tin. For most purposes glass funnels are to be preferred.

Filtering Paper (*Filter-paper*).—A specially prepared, unsized paper used in filtration. It is usually of two grades, gray and white. The gray is the cheaper and is suitable only for filtering *neutral* liquids.

Filtrate.—The liquid which has passed through the filter.

Fortification (fôr''ti-fi-kā'shọn).—*Origin.*—L. *fortis*, strong + *facere*, make.

Definition.—The process of adding alcohol to any spirituous liquid for the purpose of increasing its alcoholic content.

Example.—In the United States Pharmacopœia of 1880 the

Vinum Album Fortius was prepared by adding 125 gm. of alcohol to 875 gm. of white wine.

Fusion (fū'zhọn).—*Origin.*—L. *fusio*, from *fundere*, melt.

Definition.—The process of liquefying a substance by the application of heat. Compare *Solution*, page 74.

Example.—Waxes are liquefied by fusion in the preparation of Cerates, etc.

Granulation (gran-ṳ-lā'shọn).—*Origin.*—L. *granum*, grain.

Definition.—The process of reducing substances to coarse particles of approximately uniform size, called granules.

Example.—The Official Granulated Ferrous Sulphate is prepared by this process. Various salts and compounds are directed to be granulated before they are compressed into tablets.

Procedure.—Vegetable drugs are usually granulated by alternate grindings and siftings, as in the preparation of the Official Granulated Opium.

Chemicals are usually granulated by one of the following processes:

(a) By constant stirring while slowly evaporating their solutions to dryness. The evaporation is rapid at first until a pellicle forms over the surface. The solution is then stirred rapidly while the temperature is gradually reduced to prevent spurting and caking. This process is not recommended for granulating substances which have water of crystallization; they are best granulated by process (c).

(b) By pouring the concentrated solution into a liquid which has a greater affinity for the solvent. This process is illustrated by the granulation of Ferrous Sulphate as directed by the United States Pharmacopœia of 1880.

(c) By evaporating the solution to a definite concentration and then rapidly cooling it, during constant agitation. This method is used in preparing the Granulated Ferrous Sulphate of the U. S. P. IX, and in granulating salts which have water of crystallization.

(d) By passing a pasty mass, made from finely powdered substances by the addition of a volatile liquid which should be but an imperfect solvent for them, through a coarse (No. 6) sieve, and then rapidly drying it. When Citric Acid is used, enough water of crystallization may be liberated to form the pasty mass by placing the powder in an oven heated to between 93° and 104° C. The Effervescent Salts of the U. S. P. IX are granulated in this manner. See page 385.

Grating (grā′ting).—*Origin.*—ML. *gratare*, a grating.

Definition.—The process of reducing flesh drugs to a coarse powder by acting on them with a grater. Compare *Rasping*, see page 73.

Example.—Nutmegs, horse-radish, etc., are comminuted in this manner.

Grater.—A thin sheet of metal having its surface dotted with protruding teeth, produced by perforating it with a triangular punch.

Grinding (grīn′ding).—*Origin.*—A. S. *grindan*, grind.

Definition.—The process of reducing substances to particles by means of a suitably constructed apparatus called a mill. This is the process usually employed in comminuting cellular substances.

Example.—Most vegetable drugs are ground before extraction.

Procedure.—In operating small hand mills time will usually be saved if the drug is passed through the mill several times, removing the particles which are of the desired degree of fineness each time by sifting. The grinding surfaces are brought nearer together with each passage until all the substance has been reduced to the proper degree of fineness. The comminuted drug should then be thoroughly mixed. Nearly every drug requires a little different treatment, and considerable experience is required to secure the best results. In grinding resinous drugs every precaution should be taken to prevent the grinding surfaces from becoming heated, as this will cause the drug to fuse and adhere to them and necessitate a delay that is not altogether pleasant to the operator. Dandelion, Jalap, and Aconite afford examples.

Drug Mills.—These are usually classed according to some peculiarity in their construction or method of operation; as, for example, Buhrstone, Chaser, Pot, Ball, Roller, Excentric, Disintegrator, etc. The grinding surfaces of the Buhrstone type may be either vertical, conical, or horizontal.

The choice of one for any particular purpose should be governed by experience. For the smaller operations of the drug store almost any of the ones ordinarily offered will answer. They should be simple in construction, with grinding surfaces easily accessible, so that the mill may be easily repaired and quickly and thoroughly cleaned.

Cleaning.—The simplest method of cleaning a drug mill is to pass saw-dust through it repeatedly, then remove the grinding plates and brush them, or, if necessary, wash them with hot water and dry them quickly.

Hygroscopic (hī-grọ̄-skop′ik).—*Origin.*—Gr. *hygro,* wet + *skopein,* view + ic.

Definition.—Having the property of absorbing moisture from the air. In pharmacy this term is used especially in connection with those substances which are not rendered sensibly liquid, in contradistinction to *deliquescent.*

Hygroscopic Substances:

Acid, Sulphuric.
Alum, Exsiccated.
Ammonium Iodide.
Bismuth Subnitrate.
Calcium Sulphate, dried.
Glycerin.
Hydrastine Hydrochloride.
Magnesium Oxide.
Potassium Nitrate.
Sodium Bromide.
Sodium Chloride.
Sodium Nitrate.
Sodium Phosphate, Exsiccated.
Sparteine Sulphate.

Ignition (ig-nish′o̤n).—*Origin.*—L. *ignitio,* from *ignire,* to set on fire.

Definition.—The process of intensely heating an inorganic substance for the purpose of freeing it from small quantities of impurities, and to insure its having a definite composition.

Example.—Inorganic chemicals and precipitates are usually ignited before they are weighted, when some element or compound is to be quantitatively determined, as in the United States Pharmacopœial gravimetric tests.

Incineration (in-sin-e̤-rā′sho̤n).—*Origin.*—L. *incineratio,* from *in,* in + *cinis* (cineris), ashes.

Definition.—The process of reducing organic substances to ashes.

Example.—Vegetable substances are incinerated when it is desired to determine the percentage of ash or inorganic matter contained in them.

Infusion (in-fū′zhọn).—*Origin.*—L. *infusio,* from, *in,* in + *fundere,* to pour.

Definition.—The process of extraction which consists of steeping a substance in water or other menstruum.

Example.—The Official Infusions are prepared by this process, see page 331.

This process is adapted especially to the extraction of the soft parts of plants, such as leaves, etc. It extracts the virtues from a drug more rapidly than maceration and with less danger of injuring or dissipating them than decoction.

Infusion Mug.—A specially constructed chinaware vessel provided with a perforated diaphragm near the top and having a capacity of about 1 liter, used in preparing infusions.

Infusion.—The solution of vegetable principles which has been prepared by infusion.

Infusions.—See page 331.

Leaching (lēch′ing).—See *Lixiviation.*

Levigation (lev-i-gā′shọn).—*Origin.*—L. *levigatio,* from *levigare,* make smooth.

Definition.—The process of reducing a substance to a state of minute subdivision by rubbing it, while in a moist condition, between two hard surfaces.

Example.—Prepared (levigated) Chalk is prepared in this manner.

Muller.—An instrument of glass or stone resembling a pestle, but having a broad, flat head, used as the upper or movable surface in levigating.

Porphyrization (pôr″fi-ri-zā′shọn).—The levigation of a substance on a slab of porphyry, a stone especially suited for this purpose on account of its hardness.

Lixiviation (lik-siv-i-ā′shọn).—*Origin.*—L. *lixiviatio,* from *lixivium,* lye.

Definition.—The process of extracting alkaline salts from insoluble earthly materials, contained in suitable vessels, by allowing water to pass slowly down through them.

Compare *Percolation,* see page 67.

Example.—This process is used in extracting the soluble potassium salts from wood ashes in the preparation of crude potassium carbonate.

Procedure.—The earthy matters are placed in large containers having perforated bottoms, called hoppers, and extracted by allowing water to percolate slowly through them.

Lixivium.—The solution of alkaline salts obtained by lixiviation.

Lotion (lō'sho̤n).—*Origin.*—L. *lotio*, wash.

Definition.—The process of removing soluble impurities from an insoluble substance by causing a liquid to pass down through it, thus dissolving and carrying them away. Compare *Lotion*, see page 347.

Procedure.—The substance is usually placed in a funnel having the neck partially closed with a porous diaphragm, a notched cork, or plug of cotton, to prevent the passage of the insoluble substance. The solvent is added in successive portions until the impurities have been removed sufficiently.

Maceration (mas-e̤-rā'sho̤n).—*Origin.*—L. *maceratio*, from *macerare*, make soft.

Definition.—The process of extracting the soluble constituents of a drug by allowing it to remain in contact with the menstruum at the ordinary temperature until the desired constituents have been dissolved.

Example.—Certain Official Tinctures are prepared by this process, Tincture of Guaiac, Benzoin, etc. See *Tinctures*, page 413.

Procedure.—Place the substance, which has previously been bruised or coarsely comminuted, in a suitable vessel and pour over it the required quantity of menstruum. Close the vessel to prevent evaporation, and allow it to remain in a warm place, agitating it occasionally, until the process is completed. The time varies from one to fourteen days, depending upon the nature of the drug extracted.

Percolation (pėr-kọ̄-lā'sho̤n).—*Origin.*—L. *percolatio*, from *per*, through + *colare*, strain.

Definition.—The process of depriving powdered, cellular substances of their soluble constituents by the slow descent of a menstruum through them.

This process requires some care and attention, but when properly carried out it is rapid and complete in its action.

Example.—This is the process of extraction which is generally used in preparing the Official Tinctures and Fluidextracts.

Choice of Percolator.—The shape of the percolator to be used depends upon the nature of the drug (see *Preparation of Drug*) and upon the character of the menstruum. In most cases a cylindric percolator is used; a conical percolator is used when the nature of the drug is such that the menstruum will not penetrate a deep layer of it, as in the case of drugs like squill; also when the drug is easily extracted, or when the quantity of menstruum is relatively large or aqueous in character.

Size of Percolator.—The percolator should be of such size that it will not be filled more than four-fifths full of the firmly packed drug.

Preparation of Percolator.—Insert into the neck of the percolator a perforated cork bearing a small glass tube 2 or 3 centimeters longer than the cork. The inner end of this tube should be flush with the inner end of the cork. To the outer, projecting end of the glass tube attach a piece of small rubber tubing about one-fourth longer than the percolator, ending in another glass tube so bent that it may be hooked over the lip of the vessel which is intended to receive the percolate. Gently press a small tuft of absorbent cotton into the neck of the percolator above the cork and it is ready to receive the drug. A thin layer of clean sand may, if desired, be used to hold the cotton in place.

Preparation of the Drug.—The particles of the drug should be as nearly as possible of uniform size. The degree of fineness will depend upon the cellular structure of the drug as well as upon the nature of the menstruum to be used. A very fine powder is indicated when the vegetable cells are small or thick walled, and when the menstruum is strongly alcoholic. Conversely, a coarse powder is indicated when the vegetable cells are large or thin walled, and when the menstruum is aqueous in character.

Put the desired weight of the drug of the proper degree of fineness into a basin and add to it the specified quantity of menstruum. Thoroughly stir it with a spatula and then, if necessary, pass the moistened powder through a coarse sieve to break up the lumps. The number of the sieve used for this purpose should be about one-half the number of the powder. Thus, a No. 20 sieve for a No. 40 powder, etc. Transfer the moistened powder to a sheet of thick paper and pour the entire quantity at once into the percolator. Shake it down gently and allow it to remain for the specified time, a period which may vary from fifteen minutes to several hours. When the menstruum has become uniformly distributed throughout the drug, press it by the aid of a plunger of suitable size, more or less firmly, as will be indicated by the character of the drug and the alcoholic strength of the menstruum. The indications for finely powdering the drug may also be taken as indicating that the drug should be firmly packed.

The Process.—Place the percolator in position and cover the top of the powder with an accurately fitting disk of filter-paper. This disk is held in position with any convenient substance. Special percolator weights are to be had, but a glass stopper or a thin layer of clean sand will usually suffice. Raise the end of the rubber outlet tube above the level of the percolator and then add the menstruum in sufficient quantity to saturate the powder and leave a stratum above it. Cover the percolator closely to prevent evaporation, and allow the drug to macerate the length of time specified in the formula, which usually ranges between six and forty-eight hours. To start percolation, lower the end of the outlet tube, and collect the percolate in a graduated receiver. The rate of percolation for 1000 gm. of drug in making fluidextracts should range from 2 to 5 drops per minute. In preparing 1000 mils of tincture the rate of percolation may be increased to from 8 to 15 drops per minute. The rate of percolation is regulated by raising or lowering the delivery end of the rubber tubing. The menstruum is conveniently supplied from a bottle inverted over the top of the percolator. The neck of the bottle should reach nearly to the surface of the powder, and the size and shape of the bottle, if possible, should be such that it will serve as a cover to the percolator.

In those instances where the drug is directed to be macerated with a large proportion of menstruum in some other vessel than the percolator and the process of extraction finished by percolation, the liquid portion should be decanted as completely as possible and the solid matter packed in the percolator. The liquid portion is then poured on, and when it has receded below the surface of the solid matter a sufficient quantity of the original menstruum is immediately added to complete the extraction.

Percolate.—The liquid which is delivered from the percolator.

CONTINUOUS PERCOLATION, or EXTRACTION.—*Definition.*—A process of percolation in which the menstruum is automatically transferred from the receiver to the top of the percolator by vaporization and subsequent condensation. This process finds application when it is necessary to secure complete extraction with a minimum quantity of menstruum and a minimum amount of attention from the operator.

The menstruum employed must necessarily be easily vaporized and the principles to be extracted such as are not injured by the continued heating.

Example.—This method is especially applicable when oleoresinous drugs are to be extracted with ether.

Continuous Extractor.—A modified percolator in which provision is made for the downward passage of the percolate to the receiver and for the upward passage of the vapors of the solvent to the condenser. The condenser is fitted to the top of the percolator in such a manner that the condensed liquid is returned to the upper surface of the powder in the percolator.

DIVIDED PERCOLATION.—See *Fractional Percolation.*

FRACTIONAL PERCOLATION.—See also *Process C,* page 316. *Definition.*—A modified form of repercolation, authorized by the N. F. III, in which there are no weak percolates to be stored until the next operation. It differs from repercolation in that the drug is divided into three unequal fractions. Thus, for 1000 gm. of drug, the fractions would be 500 gm., 325 gm., 175 gm., respectively. These fractions are extracted analogously to the fractions in repercolation. However, only 175 mils of percolate are reserved from the first fraction of 500 gm. The weak percolates from this fraction are used to extract the second fraction of 325 gm., and 325 mils of percolate are reserved. The third fraction of 175 gm. is extracted with the weak percolate from fraction two and only 500 mils of percolate are collected from it. Finally, the three portions of percolate, of 175, 325, and 500 mils respectively, are thoroughly mixed. This process, when carefully carried out, yields good results, but cannot be trusted in inexperienced hands.

REPERCOLATION.—*Definition.*—A process of extraction used to prepare fluidextracts in which the first portion of the percolate is reserved as a finished product, and the succeeding portions are used in the order of their collection as menstruum to extract a second portion of the drug, and so on in repetition. By this process the evaporation of the percolate is eliminated. The process was first proposed by Dr. E. R. Squibb in 1866,[1] who defined it as "The successive application of the same percolating menstruum to fresh portions of the substance to be percolated."

Procedure.—To start the process take four equal fractions of the drug of any convenient weight, as of 250 gm. each. Prepare and extract the first fraction according to the directions given under *Percolation*, page 67. Reserve the first 200 mils of the percolate and collect the remainder in portions of 250 mils each. Ordinarily 4 portions will be sufficient. These portions are labeled 1, 2, 3, 4 in the order of their collection. Use portion 1 of this percolate to prepare the second fraction of the drug and percolates numbered 2, 3, 4, etc.—in order—to complete the extraction, following with 250 mils more of fresh menstruum. In this case the time of maceration may be shortened to one-half or one-fourth that allowed in the first instance. The percolate from the second fraction of drug is collected in five portions of 250 mils each. The first 250 mils portion is reserved and the remaining 4, labeled 1, 2, 3, 4. The extraction of fractions 3 and 4 is a repetition of the extraction of fraction 2. Unite the portions of reserved percolates to form 950 mils of finished fluidextract.

The remaining portions of percolate, numbered 1, 2, 3, 4, are stored in a cool place until it is necessary to prepare more of the fluidextract. Subsequent operations are conducted exactly as on fraction 2, reserving each time 250 mils of finished extract. This process is excellent for continuous operation, but for small or infrequent ones is not so convenient as the official method of preparing fluidextracts.

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[1] Proc. Amer. Pharm. Assoc., 1866, vol. xiv, p. 81; 1878, vol. xxvi, p. 708.

Percolator.—A nearly cylindric or slightly conical vessel with a funnel-shaped end, used to hold the powder which is to be exhausted by percolation.

For small operations, where the quantity of drug to be extracted is less than 10 kg., they are made of glass. For larger operations they are constructed of less fragile material, such as stoneware, copper, galvanized iron, wood, etc. For a conical percolator use an ordinary glass funnel.

Porphyrization (pôr″fi-ri-zā′sho̤n).—*Origin.*—From porphyry, a fine-grained rock, remarkable for its hardness.

Definition.—See *Levigation*, page 66.

Precipitation (prẹ̄-sip-i-tā′sho̤n).—*Origin.*—L. *præcipitare*, cast down headlong.

Definition.—A process of separation in which a substance is caused to separate in a visible form from its solution.

Example.—The addition of ammonia-water to the solution of ferric sulphate causes a precipitation of ferric hydroxide.

Procedure.—Precipitation is most generally brought about by chemical reaction in solution wherein the resulting compound is insoluble.

Kinds of Precipitates.—According to appearance, precipitates are designated as bulky, curdy, crystalline, flocculent, gelatinous, and granular, also as heavy and light precipitates. Heavy precipitates are formed when the chemical reaction takes place in hot concentrated solutions. Light precipitates are formed when the chemical reaction takes place in cold dilute solutions.

Precipitating Jars.—Tall, comparatively narrow vessels, which are wider at the bottom than at the top. They are usually made of glass.

Precipitant.—The active chemical agent which brings about the precipitation.

Supernatant Liquid.—The clear liquid remaining above a precipitate or a sediment.

Pulverization (pul″ve̤-ri-zā′sho̤n).—*Origin.*—L. from *pulvis*, dust, powder.

Definition.—The general term for reducing substances to very fine particles. This is usually accomplished by grinding or triturating.

Impalpable Powder.—One in which the particles are so fine as to produce no sensation of grittiness when rubbed between the thumb and finger.

Pulverization by Intervention.—*Origin.*—L. (see *Pulverization*) + *inter*, between + *venire*, come.

Definition.—The process of comminuting substances by triturating them with some foreign substance which may afterward be removed.

Example.—Gold Leaf is pulverized by triturating it with potassium sulphate. The potassium sulphate is afterward removed by washing.

Rasping.—*Origin.*—Fr. *raspe*, rasp.

Definition.—The process of reducing hard, horny substances to particles by acting upon them with a rasp.

Rasp.—A piece of hardened metal having its surface dotted with separate protruding teeth formed by the indentation of a pointed instrument.

Recrystallization.—See page 50.

Roasting.—See *Torrefaction*, page 81.

Sedimentation (sed″i-men-tā′shọn).—*Origin.*—L. from *sedimentum*, settling.

Definition.—A process of clarification in which the liquid is allowed to remain at rest until the insoluble particles settle to the bottom of the container by reason of their greater specific gravity.

Sediment.—The solid matter separated from the liquid by the action of gravity.

Sifting (sif′ting).—*Origin.*—A. S. *syftan*, sift.

Definition.—The process of separating the coarse from the fine particles of a comminuted substance by means of a sieve.

Sieve.—A broad shallow vessel with wire-cloth bottom used in sifting. The fine particles of the comminuted substance are forced through the meshes of the wire-cloth by shaking or rubbing.

Sieves are designated by the number of meshes to the lineal inch in the wire-cloth bottom. Thus, a No. 60 sieve is one in which the wire-cloth bottom has 60 meshes to the lineal inch.

Fineness of Powders.—Powders are designated by the number of the sieve through which they pass. Six degrees of fineness are generally recognized, to wit:

No. 80 is a very fine powder.
No. 60 is a fine powder.
No. 50 is a moderately fine powder.
No. 40 is a moderately coarse powder.
No. 20 is a coarse powder.
No. 12 is a very coarse powder.

As the size of the particles of a powder is governed by the size of the openings (meshes) of the sieve through which they pass, it should be noted that the diameter of the wire used has an important bearing upon the size of the mesh and, consequently, upon the size of the particles of the powder. It is, therefore, necessary, for accuracy, to designate the maximum size of the powder particles. The larger proportion of the powder of any number must not pass through a sieve of a lower degree of fineness. The following diameters of particles are specified in the U. S. P. IX:

Number of powder.	Diameter of particles less than:
100	0.14 mm.
80	0.17 "
60	0.23 "
50	0.28 "
40	0.38 "
30	0.54 "
20	0.85 "
12	1.47 "
6	3.00 "

Solution (sǫ-lū'shǫn).—*Origin.*—L. *solutio*, a loosing, dissolving.

Definition.—The process of causing a solid, liquid, or gaseous substance to disappear upon bringing it into contact with a liquid, called a solvent. The disappearing substance is said to have dissolved.

Procedure.—All that is necessary to secure the solution of a soluble substance is to bring it into contact with the solvent liquid. In small pharmaceutic operations the solid and liquid are usually placed in a solution mortar and agitated with a pestle. The solution of a solid is hastened in the following ways:

(1) *By comminution*, which exposes a greater surface to the action of the solvent.

(II) *By agitation*, which constantly removes the saturated liquid from the surface of the solid particles.

(III) *By increasing the temperature*, which increases the solvent powers of the liquid toward most solids, while the convection currents serve to agitate the liquid. These factors are intensified if the liquid is boiled.

(IV) *By circulatory solution*, see page 45.

SOLUTION MAY BE OF THREE KINDS.—(I) *Simple solution* results when the substance dissolved undergoes no chemical change. It is usually accompanied by a lowering of temperature. From a solution thus prepared, if a volatile solvent be used, the dissolved substance can be recovered unchanged by the simple process of evaporation.

Example.—If sodium carbonate and water are brought together in the proper proportions, solution results. If this solution is subjected to evaporation, the water is slowly removed and the sodium carbonate will be restored to its former condition.

(II) *Chemical solution* or *complex solution* results when the substance dissolved undergoes chemical change. It is usually accompanied by a rise in temperature. From a solution thus prepared the dissolved substance cannot be recovered unchanged by the simple process of evaporation.

Example.—If sodium carbonate and diluted hydrochloric acid are brought together in the proper proportions, solution results. If this solution is subjected to evaporation the liquid is removed, but the residue remaining is not sodium carbonate, but sodium chloride. The solution has resulted in the formation of another compound.

(III) *Compound solution* results when the solvent used is itself a solution.

Example.—Iodine is only sparingly soluble in water, but it dissolves readily in an aqueous solution of potassium iodide.

Immiscible Solvent.—A solvent which will not dissolve in water. The important ones are ether, chloroform, benzin, and amyl alcohol.

Menstruum.—A liquid which is capable of dissolving only a portion of the substance acted upon.

Solubility.—The capacity of any substance for being dissolved in a liquid.

Solubility is also used to express the extent to which any substance may be dissolved in any given liquid. When not otherwise specified, the liquid is understood to be water.

In the U. S. P. IX the solubility of a substance is expressed by the number of mils of the given liquid required to dissolve 1 gm. of the substance at standard temperature. In some other standard works the solubility is expressed by the number of parts of the substance that are dissolved by 100 parts of the liquid.

Indefinite terms, such as "very soluble," "readily soluble," "soluble," "sparingly soluble," etc., are also used to express the solubility.

For methods of determining the solubility of various substances the student is referred to the various standard works on chemistry. A rough approximation, sufficient for most pharmaceutic purposes, may be made by placing 1 gm. of the finely pulverized substance in a graduated cylinder and gradually adding the required liquid, vigorously shaking, until solution is effected.

Solute.—The substance dissolved.

Solvent.—A liquid which is capable of dissolving the substance acted upon.

SOLVENTS GENERALLY USED IN PHARMACEUTIC OPERATIONS.—*Water* is the most extensively used of all solvents and possesses a very great range of action. The terms "soluble" and "insoluble," when used in connection with a substance, have reference to its behavior toward water as a solvent. The great majority of the inorganic salts are soluble in water.

Alcohol stands next to water in importance as a solvent in pharmaceutic operations. Substances which are readily soluble in alcohol are, as a rule, almost insoluble in water. Alcohol has the advantage over water as a solvent for vegetable principles in that the solutions are more permanent. On the other hand, it has the disadvantage that in itself it has therapeutic properties which may interfere with, or antagonize, the therapeutic properties of the dissolved drug.

From vegetable drugs it extracts principles which are insoluble in water, and at the same time it fails to dissolve many of the inert and objectionable principles, such as gums and proteins, which water does extract. Various dilutions of alcohol with water combine the solvent properties of each.

Glycerin is an excellent solvent, though not as extended in its range as either water or alcohol. It exerts a slight preservative influence on vegetable extracts. It is used as an ingredient in the menstruum for extracting many drugs which are rich in tannic acid principles, such as cinchona, kino, etc. Glycerin is very hygroscopic, and on this account it is added to many plastic preparations.

Ether is an excellent solvent for oils, resins, and a number of the alkaloids. It is very volatile and also extremely inflammable.

Chloroform resembles ether in its solvent properties. It is a more general alkaloidal solvent than ether, and, though less volatile, it has the great advantage over it of being non-inflammable.

Benzin is similar to ether in its solvent properties. It is not a general solvent for alkaloids. It is very inflammable.

Acetone is a good solvent for oils and resins. It replaced ether in the official process for preparing oleoresins of the U. S. P. VIII.

Carbon Disulphide is an excellent solvent for rubber and phosphorus. It is very inflammable and has a disagreeable odor.

Acids, both strong and dilute, are used in preparing chemical solutions.

Acetic Acid.—Diluted acetic acid is a good solvent for many vegetable principles. It is the menstruum used in preparing the official vinegar. A slightly stronger acid was used in preparing the fluidextracts of squill, sanguinaria, and lobelia of the U. S. P. VIII.

Solution.—The liquid containing the dissolved substance.

KINDS OF SOLUTIONS WHICH ARE OF PHARMACEUTIC IMPORTANCE.—A *chemical solution* is one formed as the result of chemical reaction.

A *compound solution* is one which contains two or more dissolved substances, also one formed as the result of compound solution.

A *normal solution* (N/1) is a standard solution which contains in one liter a sufficient quantity of chemical reagent to replace, unite with, or directly or indirectly bring into action one gramme of hydrogen. A liter of such a solution always contains the number of grammes of chemical reagent equal to the molecular weight of the chemical reagent divided by the number of active hydrogen atoms it contains, or by the number of hydrogen atoms the active element can replace or unite with, either directly or indirectly. Thus: One liter of normal solution of H_2SO_4 (Molecular Weight [M. W.], 98.09) would contain 98.09 divided by 2, or 49.045 grammes of H_2SO_4. One liter of normal $AgNO_3$ (M. W. 169.89) would contain 169.89 grammes of $AgNO_3$, since one atom of silver is required to replace one atom of hydrogen. One liter of normal $KMnO_4$ (M. W. 158.03) would contain 158.03 divided by 5, or 31.606 grammes of $KMnO_4$ because there are two and one-half active oxygen atoms, each of which is capable of replacing, or uniting with, two hydrogen atoms.

Double normal (N2), *half normal* $\left(\frac{N}{2}\right)$, *fifth normal* $\left(\frac{N}{5}\right)$, *tenth normal* $\left(\frac{N}{10}\right)$, *centinormal* $\left(\frac{N}{100}\right)$, etc., contain, respectively, twice, $\frac{1}{2}$, $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{100}$, etc., of the normal weight of chemical in a liter.

Solutions of this character are used in volumetric analysis and hence are known as Volumetric Solutions (V. S.).

Normal salt solution and *normal solution* are terms incorrectly used to denote a *physiologic salt solution*.

A *physiologic salt solution*, *saline solution*, *salt solution* is a carefully sterilized aqueous solution of Sodium Chloride. For use in man it varies in strength, according to different authors, from 0.7 to 0.9 per cent. See *Liquor Sodii Chloridi Physiologicus*, page 345.

A *saturated solution* is one which is incapable of dissolving any more of the substance under the existing conditions. A solution which is saturated with reference to one substance may still be a good solvent for others.

Example.—In the official assay of opium the crystallized morphine is freed from other soluble substances by washing it with water saturated with morphine.

A *simple solution* is one formed by simple solution, also one containing a single dissolved substance.

A *standard solution* is a solution used in quantitative analysis and made of such strength that one cubic centimeter of it corresponds to some convenient, definite quantity of substance whose amount is to be determined by measuring the volume of standard solution required to complete some suitable reaction with it.

A *supersaturated solution* is one which under existing conditions contains more of the dissolved substance than is possible under normal conditions.

Example.—If a hot concentrated solution of Sodium Sulphate is slowly cooled, no separation will immediately take place; however, if a small particle of the salt is thrown into the liquid the entire mass suddenly solidifies. The liquid was supersaturated.

A *test solution* (T. S.) is a solution used in qualitative analysis to indicate the presence of certain elements or groups of elements. Their strength is usually in no way related to the molecular weight of the reacting chemical.

Spontaneous Evaporation.—*Origin.*—L. *spontaneus*, willing, and *evaporate*, disperse in vapor.

Definition.—See *Evaporation*, page 59.

Sterilization.—See U. S. P. IX, page 616.—*Origin.*—L. *sterilis*, barren + ize.

Definition.—The process of destroying or removing all forms of micro-organisms, such as are commonly known as germs, bacteria, yeasts, molds, spores, etc.

The organisms develop rapidly in nutritive media at a temperature of about 25° C. Their development is retarded, but they are not destroyed by refrigeration or by antiseptics. Their destruction is accomplished by heat either "dry" or "moist," and by the action of certain chemicals known as germicides and disinfectants. These latter, if used in too small quantity, act only as antiseptics. These micro-organisms may be removed from solution by passing the solution through stone or porcelain filters which have been tested and proved efficient.

Sterilization usually infers the use of heat, and *disinfection* the use of chemicals, particularly in the destruction of pathogenic organisms.

Substances which will stand the temperature may be sterilized by placing them in an oven heated to 160° to 170° C. for two hours. If they will stand heat and moisture the same result may be accomplished by heating them in a closed vessel under steam pressure (autoclave) at a temperature of 115° to 120° C. for fifteen minutes. Heating in a current of steam for thirty minutes or boiling for fifteen minutes in water will kill all non-spore-bearing and some spore-bearing organisms, but to render the sterilization complete this process should be repeated on three consecutive days; thus the spores, which are more resistant than the mature organisms, are killed as they develop.

The following antiseptics are said to prevent bacterial development when used in the proportions indicated in the following table:

Substance.	Antiseptic.
Corrosive Sublimate	1 : 20,000
Thymol	1 : 2,000
Sodium Benzoate	1 : 2,000
Creosote	1 : 2,000
Benzoic Acid	1 : 1,000
Salicylic Acid	1 : 666
Eucalyptol	1 : 666
Phenol	1 : 200
Boric Acid	1 : 133

The use of antiseptics requires the exercise of considerable judgment. They should not be added to any prescription without the sanction of the physician.

The germicidal power of any substance is indicated by its "Phenol Coefficient," which may be defined as the quotient obtained by dividing the figure representing the dilution of the substance that kills the organism in a given time by that representing the dilution of Phenol that kills the same organism in the same time under the same conditions.

Pasteurization, as directed in the N. F. IV, page xxx, is accomplished by heating the liquid to 60° to 70° C. for from one-half to one hour a day for six successive days, keeping the liquid at a temperature near 20° C. during the intervals.

Straining.—*Definition.*—The process of separating coarse insoluble particles from a liquid by passing it through a porous medium called a strainer.

Same as *Colation*, see page 47. Compare *Filtration*, page 62.

Sublimation (sub-li-mā′shọn).—*Origin.*—L. *sublimare,* lift up.

Definition.—A process of separation which consists of converting solids into vapor and reconverting the vapor to the solid state by refrigeration. It is to solids what distillation is to liquids. Compare *Distillation,* page 55.

Example.—Camphor, benzoic acid, ammonium carbonate, etc., are purified by sublimation.

Sublimate.—The solid which has been separated, prepared, or purified by sublimation.

Sublimates are of two kinds, *powder sublimates* and *cake sublimates.* Powder sublimates, like flowers of sulphur, are prepared by conducting the vapors of the solid into large chambers in which the temperature is much below the temperature of the vaporizing chamber. Cake sublimates are prepared by maintaining the temperature of the condensing chamber only a few degrees below that of the vaporizing chamber. Camphor furnishes an example of the cake sublimate.

Torrefaction (tor-ẹ-fak′shọn).—*Origin.*—L. *torrere,* roast + *facere,* make.

Definition.—The process of modifying the action of a drug or developing new principles in it by subjecting it to a high temperature. The temperature employed is less than 250° C. or the temperature necessary to carbonize it.

Example.—Coffee is roasted to develop the aroma; rhubarb, to destroy the cathartic principles.

Trituration (trit-ų-rā′shọn).—*Origin.*—L. *triturare,* a rubbing.

Definition.—The process of reducing substances to fine particles, or of intimately mixing substances by rubbing them in a mortar with a pestle. Compare *Contusion,* page 48.

Example.—This process is employed in preparing the official triturates as well as several of the official powders, such as powder of ipecac and opium, compound powder of jalap, etc.

Procedure.—The substance is placed in a mortar of suitable size and reduced to powder by a circular motion of the pestle, usually from left to right. The circles, which are at first large, are gradually narrowed until the center of the mortar is reached, then gradually widened again. This motion is continued until the substance has the desired degree of fineness. The pestle is held in the hand in much the same position as a pen would be held, and the motion is imparted to it by the wrist and fingers, the elbow being kept close to the side of the body. In most cases it will not be necessary to "bear on," the weight of the pestle and the arm being sufficient. If the powder adheres to the mortar, and it usually will, it should be loosened from time to time with a spatula.

Spatula.—A piece of apparatus which consists of a broad flat blade, with unsharpened edges and rounded outer end, mounted in a handle. The blade may be of wood, horn, celluloid, platinum, or other suitable material.

Pill Spatula.—A spatula having a short, stiff, narrow blade.

Powder Spatula.—A spatula having a long, thin, rather wide blade.

Tablet Spatula.—A spatula, usually of horn or hard rubber, having a short, broad blade with a diagonal end.

Pocket Spatula.—A small spatula having a blade which may be folded into the handle.

Balance-handled Spatula.—A spatula having the handle so weighted as to support the tip of the blade and prevent it from coming in contact with the work table.

High Balance-handled Spatula.—A balance-handled spatula with the bolster enlarged in such a manner as to remove the blade still further from the work table.

Mortar.—A vessel in which drugs and chemicals are reduced to powder by acting upon them with the pestle. Mortars are usually made of glass, wedgewood, iron, brass, etc. Wedgewood is a superior kind of semivitrified pottery remarkable for its hardness and resistance to corrosive chemicals. It is named after its inventor, Josiah Wedgewood (1730–95), an Englishman.

Emulsion Mortar.—A broad shallow mortar with a lip, used in preparating emulsions.

Pill Mortar.—A deep narrow porcelain or wedgewood mortar used in preparing pills.

Solution Mortar.—A glass mortar, intermediate in shape between an emulsion and a pill mortar, used in preparing solutions and in general prescription practice.

Pestle (pes'l).—An instrument for pounding or breaking substances in a mortar. Pestles are made of the same materials as the mortars.

Pill Pestle.—A pestle used in connection with the pill mortar, and differing from the ordinary pestle in having a longer handle and a smaller head.

Trochiscation (trọ̄″kis-kā′sho̤n).—*Origin.*—L. *trochiscus*, a pill; *troche* + *ation.*

Definition.—The process of forming plastic masses into characteristic shapes called troches.

Example.—The formation of the official troches, and especially the formation of the small characteristic cones of prepared chalk from chalk magma.

Procedure.—For the preparation of troches see page 433. For the preparation of the cones of prepared chalk and similar substances the magma is placed in a funnel having a short, wide neck and mounted in a handle. The handle is provided with a short leg near the funnel end. By tapping the leg sharply on a solid body the inertia forces a small cone-shaped mass of magma from the funnel. The cones are rapidly deprived of their moisture by receiving them on specially prepared porous plates.

Vaporization (vā″po̤r-i-zā′sho̤n).—*Origin.*—L. *vapor*, vapor + *ize* + *ation.*

Definition.—The process of converting a substance into gas or vapor by the application of heat.

Example.—The first step in the process of distillation, or of sublimation, is vaporization.

Vapor.—The term commonly applied to the gaseous form of a substance which normally exists in a solid or liquid form.

Gas.—The term applied to the third form of matter which is neither solid nor liquid at ordinary temperature and pressure.

CHAPTER II

MEDICINAL SUBSTANCES—CHIEFLY INORGANIC CHEMICALS

UNDER this heading will be considered the mineral acids, bases, and such combinations of acids and bases, called salts, as are not completely volatilized at a high temperature by combining with oxygen.

CHEMICAL DEFINITIONS

Acid.—A compound of hydrogen with an electronegative (non-metallic) element or group of elements in which the hydrogen may be easily replaced by metals, thus forming a salt. Typical acids, if soluble in water, have a sour taste, and will change the color of litmus paper from blue to red.

CLASSIFICATION OF ACIDS.—*Complex Acid.*—An acid formed by the union of an acid with a salt. For example, $PtCl_4 + 2HCl = H_2PtCl_6$, chlorplatinic acid.

Dibasic Acid.—An acid having two hydrogen atoms which are replaceable by metals. For example, H_2SO_4, sulphuric acid.

Inorganic Acid.—An acid which does not contain the element carbon.

Monobasic Acid.—An acid having only one hydrogen atom which is replaceable by a metal. For example, HCl, hydrochloric acid.

Organic Acid.—An acid which contains the group of elements known as carboxyl (COOH). For example, CH_3COOH, acetic acid.

Polybasic Acid.—An acid having more than one replaceable hydrogen atom.

Tribasic Acid.—An acid having three hydrogen atoms replaceable by metals. For example, H_3PO_4, phosphoric acid.

Anhydride.—A combination of a non-metallic element with oxygen, capable of uniting with water to form an acid. For example, SO_3, sulphuric anhydride; $SO_3 + H_2O = H_2SO_4$, sulphuric acid.

Atom.—The smallest particle of an element that can take part in chemical reactions. Atoms do not exist in the free state, but are combined with other atoms either of the same or of different kinds. The smallest of such combination for any kind of matter is known as a molecule.

Atomic Weight (*Combining Weight*).—The number expressing the relative weight of one atom of an element compared with the weight of some unit, formerly that of the hydrogen atom, the lightest known. At present the oxygen atom is taken as the standard, with a weight of 16 units. See page 185.

Base.—A compound of an electropositive (metallic) element with oxygen and hydrogen, forming a hydroxide. For example, $Ca(OH)_2$, calcium hydroxide. See page 138.

Diacid Base.—A base having two hydroxyl radicals in the molecule. For example, $Ca(OH)_2$, calcium hydroxide.

Monacid Base.—A base having only one hydroxyl radical in the molecule. For example, NaOH, sodium hydroxide.

Polyacid Base.—A base having more than one hydroxyl radical in the molecule.

Triacid Base.—A base having three hydroxyl radicals in the molecule. For example, $Bi(OH)_3$, bismuth oxide.

Chemical.—A substance prepared by a chemical process. A substance having a definite elemental composition.

Chemical Reaction.—An interchange of elements or of radicals between two or more chemicals resulting in the formation of new substances. This interchange takes place most satisfactorily in solution, and when it results in the formation of substances one of which is either volatile or insoluble.

The desired substance formed is called the product; the other substances, the by-products. In chemical equations a bar over (sometimes under) a formula is used to indicate that that substance is precipitated.

A simple chemical reaction is one in which two elements combine to form a compound. Thus: $H_2 + O = H_2O$.

A *simple decomposition* is a reaction in which an element acts on a compound in such a way as to break it up, with the formation of a new compound. Thus: $Na + H_2O = NaOH + H$.

A *double decomposition* is a reaction in which two compounds act upon each other so as to form two new compounds. Many of the pharmacopœial salts are prepared by this method. It is utilized most advantageously when the two reacting compounds are soluble in water, and the mutual exchange of radicals produces compounds which have a greater difference in their solubilities than the original compounds. It may also be used in the dry way when the exchange of radicals will produce compounds, one of which is volatile at the temperature of the reaction. For example, in the wet way, solutions of sodium carbonate and calcium chloride are mixed with the formation of calcium carbonate and sodium chloride, thus: $Na_2CO_3 + CaCl_2 = CaCO_3 + 2NaCl$. In the dry way by heating together mercuric sulphate and sodium chloride with the formation of volatile mercuric chloride and non-volatile sodium sulphate, thus: $HgSO_4 + 2NaCl + \triangle = HgCl_2 + Na_2SO_4$. The symbol $\triangle$ is used to signify that a high temperature is necessary in order to bring about the double decomposition.

Element.—An element is the simplest form of matter, or a substance which to the present day has resisted all efforts to decompose it into parts of different kinds. Example, gold, mercury, iron, etc.

At the present time there are at least 83 substances whose elemental character is quite definitely established. Twelve of these have been used in their elemental condition as remedial agents. These are: Antimony, Bromine, Carbon, Chlorine, Gold, Iodine, Iron, Mercury, Oxygen, Phosphorus, Sulphur, Tin.

The U. S. P. IX recognizes 8 free elements; 7 are medicinal (C, Fe, Hg, I, O, P, S), and one, Zn, not medicinal. Chlorine, being a gas and difficult to handle, is recognized in the U. S. P. IX only in weak chemical combination (Bleaching Powder and Solution of Chlorinated Soda). See page 125.

About 45 of the 83 elements have, in some form or other, either free or in combination, been considered as medicinal. Of the 45 elements to whose combinations medicinal virtues are attributed, 32 contribute to the medicinal chemicals of the U. S. P. IX. See list, page 185. Some of these elements are solid, some liquid, and some gaseous.

CLASSIFICATION OF ELEMENTS.—*Alkali Metals.*—Monovalent metallic elements whose oxides are soluble in water. These solutions are alkaline in reaction. That is, they will change the color of litmus paper from red to blue. The important alkali metals are (ammonium), lithium, sodium, and potassium. Ammonium is not an element, as will be observed from its symbol, NH_4.

Alkaline Earth Metals.—Bivalent elements whose oxides are sparingly soluble in water, forming a solution which is alkaline in reaction. They are barium, calcium, and strontium.

Earth Metals.—A group of elements so named because of their presence in many earths, soils, and rocks. The important ones, pharmaceutically, are aluminum and boron (chromium and iron are included by some authorities).

Halogen Elements (*Halogens*).—A small group of non-metallic elements which are characterized by their extreme chemical activity. They unite directly with most of the metallic elements to form salts. In the order of their chemical activity they are fluorine, chlorine, bromine, and iodine.

Heavy Metals.—Metallic elements whose specific gravity is greater than 5 and greater than that of their oxides. Aluminum is frequently classed as a heavy metal, though its specific gravity is only about 2.6.

Light Metals.—Metallic elements whose specific gravity is less than 5 and less than that of their oxides. The light metals include the alkali metals, the alkaline earth metals, and aluminum and magnesium.

Metallic Elements.—Typical ones are electropositive and should be hard, lustrous, good conductors of electricity and heat, and chemically, ones that combine with oxygen to form oxides. Example, iron, zinc, potassium, etc.

Non-metallic Elements (*Metalloid*).—Typical ones do not have the physical characteristics of the metallic elements. They are electronegative, indifferent conductors of electricity, and their combinations with oxygen are known as anhydrides. Hydrogen, physically, is non-metallic; but, chemically, it behaves like a typical metallic element. The non-metallic elements of pharmaceutic significance are:

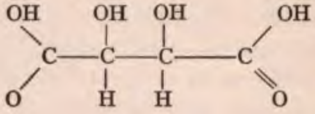
Arsenic.
Boron.
Bromine.
Carbon.
Chlorine.
Fluorine.
Hydrogen.
Iodine.
Nitrogen.
Oxygen.
Phosphorus.
Silicon.
Sulphur.

Formula.—*Symbolic formula* or *molecular formula.* Two or more symbols indicating the names of the atoms and the number of atoms of each element in the molecule or the given substance.

KINDS OF FORMULÆ.—*Constitutional Formula.*—The simplest form of a rational formula. It is intended to show the general class of compounds to which the substance belongs, usually by emphasizing the presence of a single radical. Thus, the constitutional formula for tartaric acid would be $H_2C_4H_4O_6$. It shows that the relation of the first two hydrogens in the molecule is different from that of the others. This is specificially the formula for an acid having two hydrogen atoms that are easily replaced by metallic elements.

Empyric Formula.—The simplest formula expressing the composition of the substance. It indicates the number and kinds of atoms in the molecule. Thus, the empyric formula for tartaric acid is $C_4H_6O_6$. It is also the formula for several other organic compounds.

Graphic Formula.—The most elaborate kind of a rational formula, in which the assumed valency of the atoms in the molecule and their positions and mutual relations within the molecule are represented by connecting lines or dashes. Thus, the graphic formula of tartaric acid would be:



Rational Formula.—A more elaborate formula than the empyric formula. It expresses not only the number of and kinds of atoms, but also some idea of the mode of union of the atoms, the groups of radicals contained in the substance, the class to which it belongs, etc. (See *Constitutional Formula* and *Graphic Formula.*)

Structural Formula.—A more elaborate rational formula than the constitutional formula, intended to show the various radicals present in the molecule and something of their theoretic position. Thus, the structural formula of tartaric acid would be

$C_2H_2(OH)_2(COOH)_2$, showing two hydroxyl and two carboxyl radicals in the molecule.

Hydroxides.—*Bases.*—Combinations of metallic elements with the radical hydroxyl (OH). They may be regarded as derived from water by the replacement of one-half the hydrogen in one or more molecules by a metallic element, thus: $Na + H_2O = H + NaOH$, and $Ca + 2H_2O = H_2 + Ca(OH)_2$, etc.

Ion.—One of the hypothetic particles which is formed when an electrolyte is dissolved in water. Ions may consist of either single elements, atoms, or groups of elements (radicals). Thus, when sulphuric acid is dissolved in water, it dissociates into hydrogen ions and sulphate ions. The hydrogen ions are considered as being charged with positive electricity and are called *positive ions* (cations). The sulphate ions are considered as being charged with negative electricity and are called *negative ions* (anions). When an electric current is passed through such a solution the anions will migrate to the positive electrode (anode) and the cations will migrate to the negative electrode (cathode).

If acids are dissolved in water, the hydrogen constitutes the cation and the acid radical the anion.

If bases are dissolved in water, the metallic element constitutes the cation and the hydroxyl the anion.

A neutral salt when dissolved in water gives the cation of the base and the anion of the acid whose union resulted in the formation of that salt.

Molecule.—The smallest particle of matter that can exist in a free state and still retain all the properties of the substance to which it belongs.

Molecular Weight.—The sum of the atomic weight of the elements composing the molecule; thus the molecular weight of sodium chloride, NaCl, is Na, atomic weight 23, + Cl, atomic weight, 35.46 or 58.46.

Oxide.—A combination of a metallic element with oxygen. For example: HgO, mercuric oxide. See page 147.

Oxides are named according to the number of oxygen atoms in the molecule, and their names are formed by combining the name of the element with the Greek name of the numeral signifying the desired number of oxygen atoms. For example: CO, carbon monoxide; CO_2, carbon dioxide; CrO_3, chromium trioxide; As_2O_3, arsenic trioxide; Fe_2O_3, iron trioxide, also iron sesquioxide; and Pb_3O_4, triplumbic tetroxide.

Purity Rubric (P. R.).—A purity standard which defines the amount of innocuous impurities permitted in pharmacopœial chemicals.

Radical.—An atom or group of atoms which, for special purposes, is regarded as a chief constituent of the molecule of a given compound, and which, in ordinary chemical reactions, does not lose its identity, but behaves like a single atom.

Acid Radical.—That portion of the formula of an acid which remains after the hydrogen has been taken away. Thus, SO_4, acid radical of sulphuric acid. $H_2SO_4 - H_2 = SO_4$.

Salt.—The product formed by the union of an acid and a base. Or an acid in which one or more of the hydrogens have been replaced by metallic elements. Also a base in which one or more of the hydroxyl radicals have been replaced by acid radicals. For example, Na_2CO_3, sodium carbonate. $H_2CO_3 + 2NaOH = Na_2CO_3 + 2H_2O$.

CLASSIFICATION OF SALTS.—*Acid Salt* (*Bi-Salt*).—An acid in which not all of the hydrogen has been replaced by a metal. For example, $NaHCO_3$, sodium bicarbonate. ($H_2CO_3 + NaOH = NaHCO_3 + H_2O$.)

Basic Salt (*Sub-salt*).—A base in which not all of the oxygen or hydroxyl has been replaced by the acid radical. For example, $BiONO_3$, bismuth subnitrate ($Bi_2O_3 + 2HNO_3 = 2BiONO_3 + H_2O$).

Complex Salt.—A salt formed by the union of a complex acid with a base. For example, K_2PtCl_6, potassium platinic chloride. ($H_2PtCl_6 + 2KOH = K_2PtCl_6 + 2H_2O$).

Double Salt.—A salt which results when two salts crystallize together as one compound. For example, $KAl(SO_4)_2.12H_2O$ (alum), which is formed when solutions of potassium sulphate and aluminum sulphate are mixed and crystallized.

Effervescent Salt (*Sal Effervescens*).—A mixture of a medicinal agent with an alkaline bicarbonate, solid organic acid, and sugar. Not a salt in the generally accepted use of the term. See *Salia Effervescentia*, page 385.

Mixed Salt.—A salt which results when the hydrogen atoms of a polybasic acid are replaced by two or more metals. Sometimes called a *double salt.* For example, $KNaC_4H_4O_6$ (potassium and sodium tartrate). ($H_2C_4H_4O_6 + KOH = KHC_4H_4O_6 + H_2O$) and ($KHC_4H_4O_6 + NaOH = KNaC_4H_4O_6 + H_2O$).

Neutral Salt (*Normal Salt*).—One which is neither acid nor basic. Also a salt which does not change the color of red litmus blue, or blue litmus red. For example, NaCl (sodium chloride).

Scale Salt (*Scaled Salt*).—A more or less indefinite chemical compound obtained by pouring a thick solution of the same upon a glass plate to harden. (Not a salt in the generally accepted use of the term). See:

Bismuthi et Ammonii Citras.
Ferri et Ammonii Citras.
Ferri et Quininæ Citras.
Ferri Glycerophosphas, N. F.
Ferri Phosphas.
Ferri Pyrophosphas, N. F.

Symbol.—For convenience each element is designated by a symbol. This is usually the first letter of the Latin name of the element. In cases where the Latin name of two or more elements begin with the same letter, the symbol is composed of two letters. Thus the symbol for hydrogen is H, and for mercury (hydrargyrum) Hg; for sulphur, S; for selenium, Se; for tin (stannum), Sn; for antimony (stibium), Sb, etc. (See page 185.)

Valence.—This word is used to signify the combining power of an atom or an element and is measured in terms of the combining power of hydrogen. The valence of the free element is considered to be zero. In compounds, the valence of the element is either positive (+) or negative (−).

If the element resembles hydrogen in its compounds, its valence is positive; if it resembles oxygen, its valence is negative. Some elements may have a positive valence in one compound and a negative valence in another; and some may have numerically different valences in different compounds. Hydrogen is generally considered as having a valence of 1^+; oxygen, as having a valence of 2^-. When a third element is concerned in a molecule, its valence is either positive or negative and numerically such as may be required to make the sum of the valences in the molecule zero. Thus, in HCl the valence of H is 1^+; that of Cl, 1^-. In HClO the valence of H is 1^+, that of O,

2^-. Therefore, the valence of Cl in this molecule is 1^+. In ferric chloride ($FeCl_3$) the valence of iron is 3^+, because it combines with 3 atoms of chlorine, each of which has the power of combining with only one atom of hydrogen in the analogous compound of HCl. In ferrous chloride, $FeCl_2$, the valence of iron is 2^+.

OUTLINE SUGGESTED FOR USE IN THE STUDY OR REVIEW OF INORGANIC MEDICINAL SUBSTANCES (U. S. P. OR N. F.)

1. Official name.
2. English name.
3. Official abbreviation.
4. Synonyms.
5. Symbolic formula.
6. Strength and sp. gv. if a liquid.
7. Permanency
    - Permanent.
    - Efflorescent.
    - Deliquescent.
    - Hygroscopic.
8. Preservation.
9. Physical properties
    - (a) Color.
    - (b) Form.
    - (c) Odor.
    - (d) Taste.
10. Reaction to litmus
    - Acid.
    - Alkaline.
    - Neutral.
11. Solubility
    - Water.
    - Alcohol.
    - Other solvents.
12. Chemical tests of identity.
13. Assay.
14. Process of manufacture.
15. Equations for reactions.
16. Impurities.
17. Purification.
18. Uses
    - Commercial.
    - Pharmaceutic.
19. Therapeutic properties.
20. Dose.

ACIDA—ACIDS

Origin.—L. from *acidus*, sour.

Pharmacopœial:

No. in:	U. S. P. IX.	U. S. P. VIII.	N. F. IV.
Strong Inorganic Acids......	8	9	1
Diluted Inorganic Acids.....	7	8	0
Organic Acids..............	13	13	1
Diluted Organic Acids.......	2	2	0

Definition.—A compound of hydrogen with an electronegative element, or a group of elements in which the hydrogen may be easily replaced by metals, thus forming a salt. (See page 84.)

Methods of Preparation.—The inorganic acids are prepared by chemical reaction. The organic acids are prepared by chemical reaction, though in many instances the chemical reaction is only for the purpose of separation and purification, the acid existing preformed in the plant free, as for example, citric acid, but also frequently in the form of a salt, as, for example, tartaric acid.

Advantages of Class.—They are active chemical agents. Of value in forming salts and in dissolving many substances which are insoluble in simple solvents.

Incompatibilities.—They have many incompatibilities both general and individual. In general they form salts with bases both inorganic and organic. They cause effervescence with carbonates, and they change the color of many vegetable extracts. The stronger acids displace the weaker ones from their chemical combinations.

Preservation.—The liquid acids should be kept in glass-stoppered bottles protected from direct sunlight. The solid acids may be kept in cork-stoppered bottles, though the cork should be protected with parchment or paraffined paper, and the light excluded as much as possible.

Administration.—They are usually administered in dilute solution if possible; if not soluble, administer in powdered form. The soluble acids, if at all corrosive, should be administered through a glass tube in order to protect the teeth.

For *Organic Acids*, see page 207.

ACIDUM BORICUM—Boric Acid—Acid. Bor.—*Boracic Acid*

Contains 99.5 per cent. H_3BO_3 (62.02).

Permanent in the air.

Transparent, colorless scales, of a somewhat pearly lustre, as six-sided, triclinic crystals, or as a white bulky powder; slightly unctuous to the touch; odorless; faintly bitter taste.

Acid to litmus paper. Soluble in 18 mils of water or alcohol.

Obtained by purifying the commercial boric acid obtained from natural sources, as from the waters of the lagoons in the volcanic districts of Tuscany, and also by decomposing native borax with hydrochloric acid.

$$Na_2B_4O_7 + 2HCl + 5H_2O = 4H_3BO_3 + 2NaCl$$

An ingredient in ointment of boric acid, 10 per cent., and used in preparing glycerite of boroglycerin, 31 per cent.

Antiseptic. Dose, 0.5 gm.

ACIDUM BROMAURICUM, N. F.—Bromauric Acid—Acid. Bromaur.

Contains $HAuBr_4 + 5H_2O$ (607.97), corresponding to not less than 32 per cent. of Au.

Preserve in glass-stoppered, amber-colored bottles.

Permanent in the air when pure.

Dark red-brown, flat, needle-shaped crystals, or irregular, coarse, granular masses, melting at about 27° C.; odorless; metallic and acid taste.

Acid to litmus paper. Very soluble in water and alcohol.

Obtained by dissolving auric bromide (formed by the direct action of bromine vapors on heated gold) in hydrobromic acid and concentrating the solution in a desiccator over quicklime.

Alterative. Dose, 6 mg.

ACIDUM HYDROCHLORICUM—Hydrochloric Acid—Acid. Hydrochl.—*Muriatic Acid*

Contains 31 to 33 per cent. HCl (36.47). Preserve in glass-stoppered bottles.

Colorless, fuming liquid; sp. gv., about 1.155; having a pungent odor and an acid taste.

Acid to litmus. Soluble in all proportions in water and alcohol.

Obtained by distilling a mixture of sodium chloride and sulphuric acid and collecting the gas in water and standardizing.

$$NaCl + H_2SO_4 = HCl + NaHSO_4$$

An ingredient in diluted hydrochloric acid; also used in preparing diluted nitrohydrochloric acid; extract of ergot; molded silver nitrate; nitrohydrochloric acid; precipitated sulphur; resin of podophyllum; solution of ferric chloride, and solution of zinc chloride.

Caustic.

ACIDUM HYPOPHOSPHOROSUM—Hypophosphorous Acid —Acid. Hypophos.

Contains 30 to 32 per cent. HPH_2O_2 (66.06).

Preserve in glass-stoppered bottles.

Colorless or slightly yellow liquid; sp. gv., about 1.130; odorless and having an acid taste.

Acid to litmus paper. Soluble in all proportions in water.

Obtained by decomposing barium hypophosphite with the requisite amount of sulphuric acid and separating the insoluble barium sulphate.

$$Ba(PH_2O_2)_2 + H_2SO_4 = 2HPH_2O_2 + BaSO_4$$

An ingredient in diluted hypophosphorous acid.

Tonic.

ACIDUM NITRICUM—Nitric Acid—Acid. Nitric.

Contains 67 to 69 per cent. HNO_3 (63.02).

Preserve in dark amber-colored, glass-stoppered bottles.

Colorless, very caustic and corrosive, fuming liquid; sp. gv., about 1.403; having a peculiar, somewhat suffocating odor; acid taste. Should not be tasted unless largely diluted.

Acid to litmus. Soluble in all porportions in water; decomposed violently by alcohol.

Obtained by distilling a mixture of sodium nitrate and sulphuric acid and collecting the vapor in water and standardizing.

$$NaNO_3 + H_2SO_4 = HNO_3 + NaHSO_4$$

An ingredient in diluted nitric acid.

Used in preparing nitrohydrochloric acid; diluted nitrohydrochloric acid; ointment of mercuric nitrate, and as an oxidizing agent in preparing solution of ferric chloride; solution of ferric subsulphate; solution of iron tersulphate, and solution of zinc chloride.

Caustic, oxidizing agent; when very dilute, astringent.

ACIDUM NITROHYDROCHLORICUM — Nitrohydrochloric Acid—**Acid. Nitrohydrochl.**—*Nitromuriatic Acid*

Contains hydrochloric acid, nitric acid, nitrosyl chloride, and chlorine. Should not be dispensed if 1 drop will not liberate iodine immediately when added to 1 mil of aqueous solution of potassium iodide (1 in 5).

Preserve in half-filled, dark, amber-colored bottles in a cool place.

Golden-yellow, fuming, and very corrosive liquid; strong odor of chlorine; intensely acid taste.

Prepared by mixing 18 mils nitric acid with 82 mils hydrochloric acid in a capacious glass vessel and bottling as soon as effervescence has ceased.

$$HNO_3 + 3HCl = NOCl + Cl_2 + 2H_2O$$

Oxidizing agent; solvent for gold.

Liver stimulant. Dose, 0.2 mil.

ACIDUM PHOSPHORICUM—Phosphoric Acid—**Acid. Phos.**

Contains 85 to 88 per cent. H_3PO_4 (98.06).

Preserve in glass-stoppered bottles.

Colorless liquid of syrupy consistence; sp. gv., about 1.72; odorless, and having a strong acid taste.

Acid to litmus. Soluble in all proportions in water and alcohol.

Obtained by oxidizing phosphorus with nitric acid.

$$6P + 10HNO_3 + 4H_2O = 6H_3PO_4 + 10NO$$

An ingredient in diluted phosphoric acid.

Used in preparing syrup of calcium lactophosphate, 3.6 m/m.

Refrigerant. Administered only after dilution.

ACIDUM SULPHURICUM—Sulphuric Acid—**Acid. Sulphuric.** —*Oil of Vitriol*

Contains 93 to 95 per cent. H_2SO_4 (98.09).

Preserve in glass-stoppered bottles.

Occurs as a colorless liquid of oily consistence; sp. gr., about 1.83; odorless; very caustic and corrosive.

Acid to litmus. Soluble in all proportions in water; with alcohol it forms, first, ethyl sulphuric acid, and then ether.

Obtained by two processes: the Chamber Process and the Contact Process. The Chamber Process is the older, and consists in bringing together in lead-lined chambers sulphur dioxide, water, air, and nitrogen oxides. The nitrogen oxides assist in changing the sulphur dioxide to sulphur trioxide. The sulphur trioxide dissolves in water to form sulphuric acid. The sulphur dioxide is produced by burning either sulphur or pyrites (FeS_2).

$$S + O_2 = SO_2 \text{ or } 4FeS_2 + 11O_2 = 2Fe_2O_3 + 8SO_2$$

$$2SO_2 + 2NO_2 + H_2O + O = \underset{\text{Nitrosylsulphuric acid}}{2SO_2(OH)(NO_2)}$$

$$2SO_2(OH)(NO_2) + H_2O + O = 2H_2SO_4 + 2NO_2$$

The Contact Process, which is of recent date, consists in passing the sulphur dioxide, mixed with air, over some porous material containing a catalytic agent and heated to about 350° C. and then into water. The catalytic agents used are iron oxide, vanadium oxide, or finely divided platinum.

An ingredient in aromatic sulphuric acid, 10.9 m/m, and diluted sulphuric acid. Used in preparing granulated ferrous sulphate; solution of ferric subsulphate; solution of iron tersulphate, and spirit of nitrous ether.

Sulphuric acid is one of the most important chemicals in the commercial world.

Corrosive.

ACIDUM SULPHURICUM AROMATICUM—Aromatic Sulphuric Acid—**Acid. Sulph. Arom.**—*Elixir of Vitriol*

Contains sulphuric acid and ethylsulphuric acid, together equivalent to 19 to 21 per cent. H_2SO_4 (98.09).

Preserve in glass-stoppered bottles.

A clear, reddish-brown liquid; sp. gv., about 0.933; having a pleasant, aromatic odor and an aromatic, acid taste.

Acid to litmus paper. Rendered cloudy by the addition of water; soluble in alcohol in all proportions.

Prepared by adding cautiously 10.9 mils sulphuric acid to 70 mils alcohol, and when the mixture has cooled, adding 5 mils tincture of ginger, 0.1 mil oil of cinnamon and alcohol to make 100 mils.

Tonic, astringent. Dose, 1 mil.

ACIDA DILUTA—DILUTED ACIDS

Origin.—L. *acidus*, sour + *dilutus*, from *di*, away, and *luere*, wash.

Pharmacopœial, 9, including dil. acet. acid and dil. hydrocyanic acid, U. S. P. VIII, 10; N. F., 0.

Definition.—Diluted acids are acids which are weaker than the normal acid, usually containing 10 per cent. of the absolute acid. Exceptions: Acidum aceticum dilutum (6 per cent.) and acidum nitrohydrochloricum dilutum (about one-fifth the strength of the stronger acid and not made by diluting it).

Method of Preparation.—They are made, first, by dilution, and, second, by chemical reactions. The stronger acid is diluted with water according to the following rule:

To as many grams of the stronger acid as the weaker is to be per cent., add water sufficient to make the total number of grams equal to the per cent. of the stronger acid.

Advantages of Class.—They are not so corrosive as the stronger acids, and hence may be administered without danger from their local action.

Incompatibilities.—They have the incompatibilities of the stronger acids from which they are made.

Preservation.—They are best preserved in glass-stoppered bottles, protected from the light.

Administration.—They are administered largely diluted with water and through a glass tube to avoid injury to the teeth.

ACIDUM ACETICUM DILUTUM (see page 208)

ACIDUM HYDRIODICUM DILUTUM—Diluted Hydriodic Acid—Acid. Hydriod. Dil.

Contains 9.5 to 10.5 per cent. HI (127.93).

Preserve in amber-colored, glass-stoppered bottles, protected from light, and do not dispense if it contains free iodine.

A clear, colorless, or not more than a pale yellow, liquid;

sp. gv., about 1.100; odorless; strongly acid taste and an acid reaction.

Prepared by pouring a solution of 13.5 gm. potassium iodide and 1 gm. potassium hypophosphite in 25 mils of warm water into a bottle containing a solution of 13.65 gm. tartaric acid in 40 mils diluted alcohol, shaking briskly, and after cooling the solution to 5° C. for several hours, filtering through a pledget of cotton to remove the separated potassium bitartrate, washing the bottle and crystals with sufficient diluted alcohol, added in successive portions to make 100 gm., then evaporating off the alcohol at a moderate temperature on a water-bath and diluting with sufficient distilled water to make 100 gm.

$$KI + H_2C_4H_4O_6 = HI + KHC_4H_4O_6$$
$$KP(OH)_2 + H_2C_4H_4O_6 = HP(OH)_2 + KHC_4H_4O_6$$

The hypophosphorous acid acts as a preservative, preventing the liberation of free iodine.

An ingredient in syrup of hydriodic acid, 12.5 m/m.

Alterative. Dose, 0.5 mil.

ACIDUM HYDROBROMICUM DILUTUM—Diluted Hydrobromic Acid—**Acid. Hydrobrom. Dil.**

Contains 9.5 to 10. 5 per cent. HBr (80.93).

Preserve in amber-colored, glass-stoppered bottles, protected from light.

A colorless liquid; sp. gv., about 1.076; odorless; strongly acid taste; acid reaction to litmus.

Obtained by distilling a mixture of about 50 per cent. sulphuric acid with sodium bromide and collecting the gas in water and standardizing.

$$NaBr + H_2SO_4 = HBr + NaHSO_4$$

Also may be obtained by a process analogous to that used in the preparation of diluted hydriodic acid.

$$KBr + H_2C_4H_4O_6 = HBr + KHC_4H_4O_6$$

For other processes consult a standard work on chemistry.

Sedative (like bromides), nervine. Dose, 1 mil.

ACIDUM HYDROCHLORICUM DILUTUM—Diluted Hydrochloric Acid—Acid. Hydrochl. Dil.

Contains 9.5 to 10.5 per cent. HCl (36.47).

Preserve in glass-stoppered bottles.

A colorless liquid; sp. gv., about 1.049; odorless, having a strongly acid taste and an acid reaction to litmus.

Prepared by diluting and mixing 10 gm. hydrochloric acid with 22 gm. of distilled water.

Stomachic. Dose, 1 mil.

ACIDUM HYDROCYANICUM DILUTUM—Diluted Hydrocyanic Acid—Ac. Hydrocyan. Dil.—*Diluted Prussic Acid*

Contains 1.9 to 2.1 per cent. HCN (27.02) and not more than 0.1 per cent. HCl.

Preserve in small, dark amber-colored, well-stoppered vials. Very poisonous; must be handled with great caution.

A colorless liquid, having a characteristic odor resembling that of bitter almond, and an acid reaction to litmus. Caution: Many people cannot detect the odor of HCN. Inhalation of the gas is dangerous.

Soluble in water and alcohol.

May be prepared by the process of the U. S. P. VIII: Intimately mix 6 gm. silver cyanide with a solution of 15.54 mils diluted hydrochloric acid in 44.10 mils of distilled water, and pour off the clear liquid.

$$AgCN + HCl = HCN + AgCl$$

Analgesic, antemetic. Dose, 0.1 mil.

ACIDUM HYPOPHOSPHOROSUM DILUTUM—Diluted Hypophosphorous Acid—Acid. Hypophos. Dil.

Contains 9.5 to 10.5 per cent. $HP(HO)_2$ (66.06).

Preserve in well-stoppered bottles.

A colorless liquid; sp. gv., about 1.042; odorless; strongly acid taste.

Acid reaction to litmus. Soluble in water in all proportions.

Prepared by diluting 10 gm. hypophosphorous acid with 21 gm. distilled water.

An ingredient in syrup of hypophosphites, 0.2 m/m.
Tonic. Dose, 0.5 mil.

ACIDUM NITROHYDROCHLORICUM DILUTUM—Diluted Nitrohydrochloric Acid—**Acid. Nitrohydrochl. Dil.**

Contains hydrochloric acid, nitric acid, nitrosyl chloride, and chlorine. Do not dispense unless 5 drops will immediately liberate iodine from 1 mil of aqueous solution of potassium iodide (1 in 5).

A colorless or pale yellowish liquid, faint odor of chlorine, and having a very acid taste.

Acid reaction to litmus, afterward bleaching the paper. Soluble in water.

Prepared by adding 77.8 mils distilled water to a mixture of 4 mils nitric acid and 182 mils hydrochloric acid.

$$HNO_3 + 3HCl = Cl_2 + NOCl + 2H_2O$$

Stimulant to the glands of the digestive tract. Dose, 1 mil.

ACIDUM PHOSPHORICUM DILUTUM—Diluted Phosphoric Acid—**Acid. Phos. Dil.**

Contains 9.5 to 10.5 per cent. H_3PO_4 (98.06).

Preserve in well-stoppered bottles.

A clear, colorless liquid; sp. gv., about 1.057; odorless; strongly acid taste.

Acid reaction to litmus. Soluble in water in all proportions.

Prepared by dissolving 10 gm. phosphoric acid in 76.5 gm. distilled water.

Refrigerant. Dose, 2 mils.

ACIDUM SULPHURICUM DILUTUM—Diluted Sulphuric Acid—**Acid. Sulph. Dil.**

Contains 9.5 to 10.5 per cent. H_2SO_4 (98.09).

Preserve in glass-stoppered bottles.

A colorless liquid; sp. gv., about 1.067; odorless and having a strongly acid taste.

Acid reaction to litmus. Soluble in water and alcohol in all proportions.

Prepared by pouring 10 gm. sulphuric acid, with constant stirring, into 84 gm. distilled water.

Astringent. Dose, 1 mil.

INORGANIC SALTS, BASES AND OXIDES

ALUMEN—Alum—**Alum.**—*Aluminum and Potassium Sulphate; Aluminum and Ammonium Sulphate*

Contains not less than 99.5 per cent. of Potassium Alum, $AlK(SO_4)_2 + 12H_2O$ (474.53), or of Ammonium Alum, $AlNH_4(SO_4)_2 + 12H_2O$ (453.47).

Permanent in the air. Must be labeled to indicate whether potassium alum or ammonium alum.

Colorless crystals; odorless; sweetish, strongly astringent taste.

Acid to litmus. Potassium alum soluble in 7.2 mils of water; insoluble in alcohol. Ammonium alum somewhat less soluble in water.

Obtained extensively by decomposing various clays, which are chiefly aluminum silicates, with sulphuric acid, forming aluminum sulphate. The aluminum sulphate thus formed is dissolved in water, mixed with the chloride or sulphate of either potassium or ammonium, and crystallized.

$$2Al_2(SO_4)_3 + 3KCl = 3AlK(SO_4 + AlC_3l$$

Employed in fire-proofing draperies; as a mordant and in making size.

Used in preparing aluminum hydroxide and exsiccated alum.

Astringent, externally and internally. Dose, 500 mg.

ALUMEN EXSICCATUM—Exsiccated Alum—**Alum. Exsic.**—*Dried Alum; Burnt (Burned) Alum; Alumen Ustum*

Contains not less than 96.5 per cent. of $AlNH_4(SO_4)_2$ (237.28) or of $AlK(SO_4)_2$ (258.34).

Absorbs moisture when exposed to the air. Preserve in well-closed containers, labeled to indicate whether potash alum or ammonia alum.

Do not dispense if it contains more than 10 per cent. of moisture.

A white, granular powder; odorless; sweetish, astringent taste.

Acid to litmus. Slowly soluble in about 20 mils of water; insoluble in alcohol.

Prepared by reducing 100 gm. of alum to 55 gm. by exsiccating at a temperature not exceeding 200° C.

Astringent, mild escharotic. Used externally.

ALUMINI CHLORIDUM, N. F.—Aluminum Chloride—**Alum. Chlor.**

When dried over sulphuric acid, $AlCl_3 + 6H_2O$ (241.58), it corresponds to not less than 20.5 per cent. Al_2O_3 (102.20).

Deliquescent. Preserve in well-closed containers.

White or yellowish-white, crystalline powder; nearly odorless; sweetish, strongly astringent taste.

Acid to litmus. Soluble in 0.5 mil of water and in about 4 mils of alcohol.

Obtained by dissolving aluminum or aluminum hydroxide in hydrochloric acid, evaporating carefully, and crystallizing.

Deodorizer and disinfectant in 20 per cent. water solution.

Astringent. Dose, 300 mg.

ALUMINI HYDROXIDUM—Aluminum Hydroxide—**Alum. Hydrox.**—*Aluminum Hydrate; Hydrated Alumina.*

A compound consisting principally of aluminum hydroxide, $Al(OH)_3$ (78.12).

Permanent in dry air.

Fine, white, amorphous powder; odorless and tasteless.

Insoluble in simple solvents.

Prepared by precipitating a solution of any aluminum salt, usually alum, with ammonium hydroxide or with monohydrated sodium carbonate. It is essential that the alum solution be added to the sodium carbonate solution, and not the reverse, as in the latter case it is difficult to free the precipitate from sulphates. Both solutions should be boiling hot.

$$2AlK(SO_4)_2 + 3Na_2CO_3 + 3H_2O = 2Al(OH)_3 + K_2SO_4 + 3Na_2SO_4 + 3CO_2$$

Aluminum hydroxide is a valuable absorbent and is used extensively in dusting-powders.

ALUMINI SULPHAS, N. F., U. S. P. VIII—Aluminum Sulphate—Alum. Sulph.—*Concentrated Alum; Hair-stone*

Contains not less than 99.5 per cent. $Al_2(SO_4)_3 + 16H_2O$ (630.67).

Permanent in the air.

White, crystalline fragments, powder, or shining plates; odorless; sweetish, afterward astringent taste.

Acid to litmus. Soluble in 1 mil of water, insoluble in alcohol.

Obtained by dissolving aluminum hydroxide in dilute sulphuric acid; evaporating and granulating.

$$2Al(OH)_3 + 3H_2SO_4 = Al_2(SO_4)_3 + 6H_2O$$

Employed as a mordant.

Astringent and antiseptic, chiefly used externally.

AMMONII BENZOAS—Ammonium Benzoate—Ammon. Benz.

Contains not less than 98 per cent. of $C_6H_5COONH_4$ (139.08).

Gradually loses ammonia when exposed to the air. Preserve in well-closed containers in a cool place.

White, thin, laminar crystals or powder; odorless or slightly benzoic acid-like; saline, bitter and slightly acrid taste.

Neutral or slightly acid to litmus. Soluble in about 10 mils of water and in 35.5 mils of alcohol.

Obtained by adding a slight excess of ammonia-water to benzoic acid and carefully evaporating.

$$C_6H_5COOH + NH_4OH = C_6H_5COONH_4 + H_2O$$

Diuretic, antirheumatic. Dose, 1 gm.

AMMONII BROMIDUM — Ammonium Bromide — Ammon. Brom.

Contains not less than 98.5 per cent. HN_4Br (97.96).

Somewhat hygroscopic. Preserve in well-closed containers.

Colorless, transparent, prismatic crystals or white granular powder; odorless; pungent, saline taste.

Neutral or slightly acid to litmus. Soluble in 1.3 mils of water and in 12 mils of alcohol.

Obtained by double decomposition between ammonium sulphate and potassium bromide, precipitating out the potassium sulphate by the addition of alcohol and evaporating the solution.

$$(NH_4)_2SO_4 + 2KBr = 2NH_4Br + K_2SO_4$$

Also by the action of bromine on ammonia-water and evaporating the resulting solution.

$$6Br + 8NH_4OH = 6NH_4Br + N_2 + 8H_2O$$

Hypnotic. Dose, 1 gm.

AMMONII CARBONAS—Ammonium Carbonate—**Ammon. Carb.**—*Ammonium Sesquicarbonate; Baker's Ammonia; Hartshorn Salt*

Contains varying proportions of ammonium bicarbonate, NH_4HCO_3 (79.05), and ammonium carbamate, $NH_4NH_2CO_2$ (78.07), and yields from 30 to 32 per cent. NH_3 (17.03).

Loses ammonia and carbon dioxide when exposed to the air, becoming opaque, and eventually it is converted into friable lumps or a white powder consisting of ammonium bicarbonate. It is decomposed by hot water.

Preserve in well-closed containers.

Use only the translucent pieces for medicinal purposes.

White, hard, translucent, striated masses; strong odor of ammonia; sharp, ammoniacal taste.

Strongly alkaline to litmus. Slowly soluble in 4 mils of water. Only the ammonium carbamate is soluble in alcohol.

Obtained by subliming either ammonium chloride or sulphate with chalk.

$$4NH_4Cl + 2CaCO_3 = C_2H_{11}N_3O_5 + 2CaCl_2 + NH_3 + H_2O$$

Used in preparing solution of ammonium acetate, 5 g/m, and aromatic spirit of ammonia, 3.4 g/m.

Stimulant. Dose, 300 mg.

AMMONII CHLORIDUM—Ammonium Chloride—**Ammon. Chlor.**—*Ammonium Muriate; Chloride of Ammonium; Sal Ammoniac; Hydrochlorate of Ammonia*

Contains not less than 99.5 per cent. of NH_4Cl (53.50).

Somewhat hygroscopic.

White crystalline or granular powder; odorless; cooling, saline taste.

Neutral to litmus. Soluble in 2.6 mils of water and in 100 mils of alcohol.

Obtained from the ammoniacal liquors of the gas works, or from the ammoniacal liquor (Bone-spirit) obtained as a by-product in the manufacture of animal charcoal, by neutralizing with hydrochloric acid. If these liquors are neutralized with sulphuric acid, ammonium sulphate results, which can be converted into the chloride by subliming with sodium chloride. The impure ammonium chloride thus obtained (Sal Ammoniac) is further purified by solution in water to which a little ammonia-water has been added to precipitate the impurity, iron. The filtered solution is evaporated and granulated.

$$(NH_4)_2SO_4 + 2NaCl = 2NH_4Cl + Na_2SO_4$$

The crude salt (Sal Ammoniac) is used as a soldering flux.

The official article is an ingredient in troches of ammonium chloride, 10 g/n.

Stimulant, expectorant. Dose, 300 mg.

AMMONII HYDROXIDUM

Pharmacopœial only as aqua ammoniæ and aqua ammoniæ fortior. (See page 284.)

AMMONII HYPOPHOSPHIS, N. F.—Ammonium Hypophosphite—Ammon. Hypoph.

Contains not less than 97.5 per cent. of $NH_4PH_2O_2$ (83.10).

Deliquescent. Preserve in well-closed containers.

Colorless, hexagonal plates or granular powder; odorless; saline, bitter taste.

Neutral or slightly acid to litmus. Soluble in 1 mil of water and in about 20 mils of alcohol.

Obtained by double decomposition between calcium hypophosphite and ammonium carbonate. The clear solution of ammonium hypophosphite is concentrated *in vacuo* until the salt separates.

$$Ca(PH_2O_2)_2 + (NH_4)_2CO_3 = NH_4PH_2O_2 + CaCO_3$$

Used in cases of nervous debility. Dose, 200 mg.

AMMONII IODIDUM—Ammonium Iodide—Ammon. Iod.

Contains not less than 99 per cent. NH_4I (144.96).

Very hygroscopic; soon becomes yellow on exposure to the air and light, due to loss of ammonia and the liberation of iodine. Preserve in well-closed containers, protected from light. When deeply colored it should not be dispensed.

Colorless minute cubical crystals or white granular powder; odorless or having a slight odor of iodine when colored; sharp, saline taste.

Neutral or slightly acid to litmus. Soluble in 0.6 mil of water and in 3.7 mils of alcohol.

Obtained by double decomposition between ammonium sulphate and potassium iodide, using alcohol to separate the resulting potassium sulphate, evaporating, and granulating.

$$(NH_4)_2SO_4 + 2KI = 2NH_4I + K_2SO_4$$

Resolvent. Dose, 300 mg.

AMMONII PHOSPHAS, N. F.—Ammonium Phosphate—Ammon. Phos.—*Secondary Ammonium Phosphate*

Diammonium hydrogen phosphate, $(NH_4)_2HPO_4$ (132.13), and ammonium dihydrogen phosphate, $NH_4H_2PO_4$ (115.09), corresponding to not less than 20 per cent. of combined ammonia, NH_3 (17.03).

Loses ammonia when exposed to the air. Preserve in well-closed containers in a cool place.

Colorless crystals or white crystalline powder; slight odor of ammonia; saline taste.

Neutral or slightly alkaline to litmus. Soluble in 4 mils of water; insoluble in alcohol.

Obtained by adding a slight excess of ammonia-water to phosphoric acid, evaporating, and crystallizing.

$$H_3PO_4 + 2NH_4OH = (NH_4)_2HPO_4 + 2H_2O$$

Diuretic. Dose, 300 mg.

AMMONII SALICYLAS — Ammonium Salicylate — Ammon. Salicyl.

Contains not less than 98 per cent. $C_6H_4(OH)COONH_4$ (155.08).

Permanent in dry air. Preserve in well-closed containers, protected from heat and light.

Colorless, monoclinic prisms or plates, or a white, crystalline powder; odorless; slightly saline bitter taste, with a sweetish after-taste.

Neutral or slightly acid to litmus. Soluble in 1 mil of water and in 3 mils of alcohol.

Obtained by adding salicylic acid to ammonia-water, evaporating, and crystallizing. Care should be used to exclude traces of iron.

$$C_6H_4(OH)COOH + NH_4OH = C_6H_4(OH)COONH_4 + H_2O$$

Antirheumatic; claimed to be less depressing and nauseating than sodium salicylate. Dose, 0.5 gm.

AMMONII VALERAS—Ammonium Valerate—**Ammon. Valer.** —*Ammonium Valerianate; Ammonium Iso-valerianate*

Composition somewhat variable. Contains about 98 per cent. approximately of $C_4H_9COONH_4$ (119.11).

Deliquescent in moist air. Preserve in well-closed containers.

Colorless or white quadrangular plates; odor of valeric acid; sweetish taste.

Acid to litmus. Soluble in 0.3 mil of water and in 0.6 mil of alcohol.

Obtained by passing ammonia gas into monohydrated valeric acid until saturated. Upon cooling the salt crystallizes out.

Sedative. Dose, 0.5 gm.

ANTIMONII ET POTASSII TARTRAS—Antimony and Potassium Tartrate—**Antim. et Pot. Tart.**—*Antimonyl Potassium Tartrate; Tartrated Antimony; Tartar Emetic; Tartarized Antimony*

Contains not less than 98.5 per cent. $K(SbO)C_4H_4O_6 + \frac{1}{2}H_2O$ (332.34).

Efflorescent. Preserve in well-closed containers.

Colorless, transparent crystals of the rhombic system or a white granular powder; odorless; sweet, afterward disagreeable, metallic taste.

Slightly acid to litmus. Soluble in 12 mils of water; insoluble in alcohol.

Obtained by boiling antimony oxide with potassium bitartrate and water until the hydrogen of the potassium bitartrate is replaced by the antimonyl group (SbO), and purifying by crystallization.

An ingredient in compound mixture of glycyrrhiza, 0.024 g/m, and in compound syrup of squill, 0.2 g/m.

Expectorant. Dose,.5 mg. Emetic dose, 30 mg.

ANTIMONII OXIDUM, N. F.—Antimony Oxide—**Antim. Oxid.**

Contains not less than 97 per cent. antimonous oxide, Sb_2O_3 (288.4).

White or grayish-white powder; odorless; tasteless.

Insoluble in water and alcohol.

Obtained by pouring a solution of antimonous chloride into a large bulk of water and then decomposing the precipitate of oxychloride with either sodium carbonate or ammonium hydroxide.

$$Sb_2S_3 + 6HCl = 2SbCl_3 + 3H_2S$$
$$4SbCl_3 + 5H_2O = Sb_4O_5Cl_2 + 10\,HCl$$
$$Sb_4O_5Cl_2 + Na_2CO_3 = 2Sb_2O_3 + 2NaCl + CO_2$$

An ingredient in antimonial powder, N. F., 33 per cent.

Alterative, diaphoretic, emetic, purgative. Dose, 60 mg.

ANTIMONIUM SULPHURATUM, N. F.—Sulphurated Antimony—**Antim. Sulphurat.**—*Antimonium Oxysulphuratum; Kermes Mineral*

Contains not less than 45 per cent. of antimony (Sb) chiefly in the form of antimony trisulphide, Sb_2S_3 (336.6), with small quantities of antimony trioxide, sodium pyroantimonate, and free sulphur.

Permanent in the air; becomes lighter in color when exposed to the light. Preserve in well-closed containers, protected from light.

Red-brown powder; odorless and tasteless.

Insoluble in water and alcohol.

Obtained by boiling together sodium hydroxide, antimonous sulphide, sulphur, and water, adding to the strained liquid a slight excess of sulphuric acid, and collecting, washing, and drying the precipitate.

Diaphoretic, sedative, expectorant. Dose (unofficial), 120 to 600 mg.

ARGENTI NITRAS—Silver Nitrate—**Arg. Nit.**

Contains not less than 99.8 per cent. $AgNO_3$ (169.89).

Darkens, becoming grayish-black on exposure to light in the presence of organic matter. Preserve in dark amber-colored bottles protected from light.

Colorless, transparent tabular, rhombic crystals; odorless; sharp, bitter, caustic, strongly metallic taste.

Neutral to litmus. Soluble in 0.4 mil of water and in 30 mils of alcohol.

Obtained by dissolving pure silver in nitric acid, evaporating and crystallizing.

$$3Ag + 4HNO_3 = 3AgNO_3 + NO + 2H_2O$$

Used in preparing molded silver nitrate.

Externally, astringent. Internally, astringent and antiseptic. Dose, 10 mg.

ARGENTI NITRAS FUSUS—Molded Silver Nitrate—**Arg. Nit. Fus.**—*Fused Silver Nitrate; Lunar Caustic*

Contains not less than 94.5 per cent. $AgNO_3$ (169.89).

Turns grayish black on exposure to light. Preserve in dark amber-colored bottles, protected from light.

White hard solid, generally molded in the form of pencils or cones; fibrous fracture; odorless; sharp, bitter, caustic, strongly metallic taste.

Neutral to litmus. Soluble in about 0.4 mil of water and in 30 mils of alcohol, with the exception of about 5 per cent. of insoluble silver chloride.

Prepared by melting together at a low temperature 100 gm. of silver nitrate and 4 gm. of hydrochloric acid and pouring into suitable molds.

Caustic. Used externally.

ARGENTI OXIDUM — Silver Oxide — **Arg. Oxid.** — *Argentic Oxide*

Contains, when dried to constant weight at 120° C., not less than 99.6 per cent. of Ag_2O (231.76).

Liable to reduction upon exposure to light and organic matter. It must not be triturated or combined with readily oxidizable or combustible matter, nor brought in contact with ammonia. Preserve in well-stoppered, amber-colored bottles.

Heavy, dark brownish-black powder; odorless; metallic taste.

Slightly alkaline to litmus. Very slightly soluble in water; insoluble in alcohol.

Obtained from silver nitrate by precipitation with fixed alkaline hydroxide (calcium, sodium, or potassium hydroxide).

With silver this reaction results in precipitating the oxide of the heavy metal instead of the hydroxide.

$$2AgNO_3 + 2NaOH = Ag_2O + 2NaNO_3 + H_2O$$

It is much less caustic than the other compounds of silver and is best for internal use.

Alterative, antiseptic. Dose, 60 mg.

ARSENI IODIDUM—Arsenous Iodide—**Arsen. Iod.**—*Arsenic Iodide*

Contains not less than 99 per cent. of AsI_3 (455.72).

Permanent when kept in an amber-colored, glass-stoppered bottle, in a cool place, protected from light.

Orange-red, crystalline powder; odorless; sharp, metallic taste.

Neutral or slightly acid to litmus. Soluble in about 12 mils of water with partial decomposition; soluble in about 28 parts of alcohol.

Obtained by adding finely powdered arsenic (As) to a solution of iodine in carbon disulphide and heating under a reflux condenser until chemical union takes place, evaporating, and crystallizing.

An ingredient in solution of arsenous and mercuric iodide, 1 per cent.

Alterative. Dose, 5 mg.

ARSENI TRIOXIDUM—Arsenic Trioxide—**Arsen. Triox.**—*Arsenous Acid; Arsenous Oxide; White Arsenic; Arsenious Acid; Arsenious Anhydride; Arsenic; Ratsbane.*

Contains, when dried at 100° C., 99.8 per cent. of As_2O_3 (197.92).

Arsenic trioxide is not basic, but is the anhydride of arsenious acid.

Permanent in the air.

White powder or in irregular masses. Occurs in two varieties, one amorphous and glassy, and the other crystalline and opaque, resembling porcelain. Both varieties are odorless and tasteless.

Acid to litmus. Solubility varies with variety. The glassy variety is soluble in about 30 parts, and the porcelain-like in about 100 parts, of water; soluble in about 5 parts of glycerin, but sparingly soluble in alcohol.

Obtained as a by-product during the roasting of arsenical ores. The oxide thus formed sublimes and is collected in appropriate condensing chambers. It is purified by resublimation.

An ingredient in the solution of arsenous acid, 1 per cent.; used in preparing the solution of potassium arsenite, 1 per cent.

Poison. Alterative. Dose, 2 mg.

AURI ET SODII CHLORIDUM—Gold and Sodium Chloride—**Aur. et Sod. Chlor.**

A mixture of equal parts of anydrous gold chloride, $AuCl_3$ (303.58), and anhydrous sodium chloride, $NaCl$ (58.46), representing not less than 30 per cent. of metallic gold, Au (197.2).

Deliquescent in damp air. Preserve in well-stoppered, amber-colored bottles.

Orange-yellow powder; odorless; saline, metallic taste.

Slightly acid to litmus. Very soluble in water. The gold chloride but not the sodium chloride is soluble in alcohol.

Obtained by intimately mixing equal parts by weight of the anhydrous salts.

It is not to be confused with the crystalline salt, which is obtained by evaporating a solution of chlorauric acid and sodium chloride and has the formula of $NaAuCl_4 + 2H_2O$.

Alterative. Dose, 5 mg.

BISMUTHI BETANAPHTHOLAS (IX)—Bismuth Betanaphthol—**Bism. Betanaph.**—*Bismuth Naphtholate; Bismuth Betanaphtholate; Orphol*

Compound of bismuth and betanaphthol, approximately $(BiO)_2(OH)C_{10}H_7O$ (608.06), yielding not less than 15 per cent. of betanaphthol, $C_{10}H_7OH$ (144.06), and upon ignition from 73 to 78 per cent. of bismuth oxide, Bi_2O_3 (464).

Permanent in air, darkens with age. Preserve in well-closed containers.

Buff-colored to grayish-brown, amorphous powder; odorless or having a faint odor of betanaphthol; tasteless.

Nearly insoluble in water and alcohol.

Obtained generally by the action of an alkaline solution of betanaphthol on a solution of bismuth nitrate in diluted glycerine or acid.

Intestinal disinfectant. Dose, 0.5 gm.

BISMUTHI ET AMMONII CITRAS—Bismuth and Ammonium Citrate—**Bism. et Ammon. Cit.**—*Bismuth Ammonio-citrate*

Variable composition, yielding, upon ignition, after drying over sulphuric acid, 46 to 52 per cent. of bismuth oxide, Bi_2O_3 (464).

Becomes opaque through loss of ammonia upon exposure to air. Preserve in well-closed containers protected from light.

White powder or shining, pearly, or translucent scales; odorless; metallic taste.

Neutral or faintly acid to litmus. Very soluble in water; sparingly soluble in alcohol. It is the only pharmacopœial salt of bismuth that is soluble in water.

Prepared, according to the U. S. P. VIII process, by digesting bismuth citrate with ammonia-water until dissolved; concentrating the solution and spreading it upon glass plates to scale. It is not a true salt, but belongs to the "scale salts."

Astringent. Dose, 125 mg.

BISMUTHI HYDROXIDUM

Pharmacopœial only in admixture with bismuth subcarbonate in magma bismuthi. (See page 348.)

BISMUTHI SUBCARBONAS—Bismuth Subcarbonate—**Bism. Subcarb.**—*Carbonate of Bismuth; Oxycarbonate of Bismuth; Bismuthyl Carbonate; Bismuth Oxycarbonate*

Basic carbonate of bismuth, approximately $((BiO)_2CO_3)_2 + H_2O$ (1034.02), yielding upon ignition, after drying at 100° C., not less than 90 per cent. of bismuth oxide, Bi_2O_3 (464).

Permanent in the air.

White or pale yellowish-white powder; odorless and tasteless.

Insoluble in water and alcohol.

Obtained as follows: Bismuth is first dissolved in nitric acid.

$$Bi + 4HNO_3 = Bi(NO_3)_3 + NO + 2H_2O$$

This solution is freed from arsenical compounds by the careful addition of water, which precipitates them as bismuth subarsenate, then completely precipitated by adding water and ammonia. This precipitate of bismuth subnitrate is dissolved in nitric acid, the clear solution poured into a solution of sodium carbonate, and the precipitate thus formed is collected, washed, and dried.

Astringent, tonic. Dose, 0.5 gm.

BISMUTHI SUBGALLAS—Bismuth Subgallate—**Bism. Subgal.**—*Dermatol; Bismuthyl Gallate; Subgallate of Bismuth; Bismuth Monogallate*

Basic bismuth gallate, approximately $Bi(OH)_2C_7H_5O_5$ (411.06), yielding upon ignition, after drying at 100° C., 52 to 57 per cent. of bismuth oxide, Bi_2O_3 (464).

Permanent in the air.

Bright yellow powder; odorless; tasteless.

Insoluble in water and alcohol.

Obtained by precipitating a solution of bismuth nitrate in acetic acid with a solution of gallic acid. The precipitate is washed, dried, and powdered.

Astringent, externally and internally. Dose, 0.5 gm.

BISMUTHI SUBNITRAS—Bismuth Subnitrate—**Bism. Subnit.**—*Subnitrate of Bismuth; Bismuth Oxynitrate; White Bismuth; Magistery of Bismuth*

Basic bismuth nitrate, approximately $Bi(OH)_2NO_3$ (304.03), yielding upon ignition, after drying over sulphuric acid, not less than 79 per cent. of bismuth oxide, Bi_2O_3 (464).

Slightly hygroscopic.

White powder; odorless; almost tasteless.

Slightly acid to litmus. Almost insoluble in water; insoluble in alcohol.

Obtained by dissolving bismuth in nitric acid, precipitating the impurity, arsenic, as oxyarsenate by the careful addition of water, filtering, precipitating the clear filtrate with ammonia-water, collecting, washing, drying, and powdering the precipitate.

$$Bi + 4HNO_3 = Bi(NO_3)_3 + NO + 2H_2O$$

$$Bi(NO_3)_2 + 2NH_4OH = Bi(OH)_2NO_3 + 2NH_4NO_3$$

Important astringent and tonic. Dose, 0.5 gm.

BISMUTHI SUBSALICYLAS—Bismuth Subsalicylate—**Bism. Subsalicyl.**—*Bismuth Salicylate; Bismuthyl Salicylate; Bismuth Oxysalicylate*

A basic bismuth salicylate, approximately $C_6H_4(OH)COOBi(OH)_2$ (379.06), yielding upon ignition, after drying at 100° C., 62 to 66 per cent. of bismuth oxide, Bi_2O_3 (464).

Permanent in the air. Protect from light.

White or nearly white, amorphous or crystalline powder; odorless; tasteless.

Almost insoluble in simple solvents.

Obtained by double decomposition between bismuth nitrate and sodium salicylate or by triturating warm freshly precipitated bismuth hydroxide with salicylic acid.

Intestinal antiseptic. Dose, 0.5 gm.

BROMUM, N. F., U. S. P. VIII—Bromine

Contains not less than 98 per cent. of Br. (79.92) and not more than 2 per cent. of Cl.

Very volatile. Preserve in glass-stoppered bottles in a cool place. The bottle should be inclosed in a larger vessel with the space between filled with some substance capable of absorbing and combining with any vapors of bromine which might escape; b. p., about 63° C.

Dark brownish-red, mobile, heavy liquid; sp. gv., about 3.016;

evolving reddish fumes at the ordinary temperature, which are very irritating to the eyes and lungs; peculiar, suffocating odor resembling that of chlorine. Should not be tasted (escharotic).

Destroys the color of litmus. One mil is soluble in about 90 mils of water; freely soluble in alcohol.

Obtained from the bittern (mother-liquor) of the salt works, where it exists principally as magnesium bromide. It is distilled from this concentrated liquor after the addition of sulphuric acid and manganese dioxide.

$$MgBr_2 + MnO_2 + 2H_2SO_4 = Br_2 + MgSO_4 + MnSO_4 + 2H_2O$$

For safer transportation and for disinfecting purposes *bromine blocks*, or solid bromine, is recommended. The blocks consist of a porous mass made by incinerating a mixture of diatomaceous earth with crude tartar or calcium saccharate and cut into cubes. A 45-Cc. cube will absorb about 100 gm. of bromine, which very gradually escapes on exposure.

Caution: When accidentally spilled on the skin it produces burns which are very painful and difficult to heal. The immediate application of dilute ammonia-water will check its corrosive action.

Antiseptic, disinfectant, caustic, according to concentration.

CAFFEINÆ SODIO-BENZOAS (IX). (See page 227.)

CALAMINA PRÆPARATA, N. F.—Prepared Calamine—Calamin. Præp.—*Lapis Calaminaris*

Native zinc carbonate containing a varying amount of zinc silicate, calcined at a moderate temperature; or calcined zinc carbonate containing a small amount of ferric oxide.

Pink, heavy, fine powder (No. 100); odorless; tasteless.

Insoluble in simple solvents.

Obtained by calcining and elutriating native zinc carbonate.

Used as a dusting-powder or in face lotions.

Mild astringent. Used externally.

CALCII BROMIDUM—Calcium Bromide—Calc. Brom.

A hydrated form of calcium bromide, approximately $CaBr_2 + 2H_2O$ (235.94), containing not less than 84 per cent. of $CaBr_2$ (199.91).

Very diliquescent. Preserve in well-closed containers.

White, granular salt; odorless; sharp, saline taste.

Slightly alkaline to litmus. Soluble in 0.7 mil of water and in 1.3 mils of alcohol.

Obtained by neutralizing hydrobromic acid with calcium carbonate or by double decomposition between calcium hydroxide and ammonium bromide, evaporating, and granulating.

$$2HBr + CaCO_3 = CaBr_2 + CO_2 + H_2O$$
$$\text{or } Ca(OH)_2 + 2NH_4Br = CaBr_2 + 2NH_4OH$$

Hypnotic. Dose, 1 gm.

CALCII CARBONAS PRÆCIPITATUS—Precipitated Calcium Carbonate—**Calc. Carb. Præc.**—*Precipitated Chalk; Precipitated Carbonate of Lime*

Contains, when dried at 200° C., not less than 98 per cent. of $CaCO_3$ (100.07).

Permanent in the air.

White, fine, microcrystalline powder; odorless; tasteless.

Slightly alkaline to litmus. Nearly insoluble in water; insoluble in alcohol.

Obtained as a by-product in several chemical processes. Conveniently prepared by double decomposition between calcium chloride and sodium carbonate, collecting, washing, and drying the precipitate.

$$Ca(Cl_2) + Na_2CO_3 = CaCO_3 + 2NaCl$$

Used extensively in the manufacture of dentifrices and metal polishes.

Antacid. Dose, 1 gm.

CALCII CHLORIDUM—Calcium Chloride—**Calc. Chlor.**—*Muriate of Lime; Chloride of Calcium; Hydrochlorate of Lime*

Hydrated calcium chloride, approximately $CaCl_2 + 2H_2O$ (147.02), containing not less than 75 per cent. $CaCl_2$ (110.99).

Very deliquescent. Preserve in well-closed containers.

White, slightly translucent, hard fragments, granules, or sticks; odorless; sharp, saline taste.

Neutral or slightly alkaline to litmus. Soluble in 0.62 mil of water and in about 10 mils of alcohol.

Obtained as a by-product in many chemical operations; *e. g.*, Solvay Process. It is conveniently obtained by dissolving pure calcium carbonate, such as marble, in hydrochloric acid and evaporating the solution.

$$CaCO_3 + 2HCl = CaCl_2 + CO_2 + H_2O$$

Used, after dehydration, as a drying agent, desiccant.

"Physiologic Styptic" in 1 to 2 per cent. solution, externally.

Reconstructive, internally. Dose, 0.5 gm.

CALCII GLYCEROPHOSPHAS (IX)—Calcium Glycerophosphate—**Calc. Glycerophos.**—*Calcium Glycerinophosphate; Calcium Glyceryl Phosphate*

Normal salt of glycerophosphoric acid, $C_3H_5(OH)_2PO_4H_2$ (172.11), containing, after drying at 130° C., not less than 98 per cent. of $C_3H_5(OH)_2PO_4Ca$ (210.17).

Somewhat hygroscopic. Preserve in well-closed containers.

White, fine powder; odorless; almost tasteless.

Alkaline to litmus. Soluble in about 50 mils of water; insoluble in alcohol.

Obtained by adding glycerophosphoric acid to an excess of milk of lime, filtering when cold, and washing thoroughly with water. The filtrate and washings are freed from excess of lime by means of carbon dioxide, concentrated to small bulk, and the calcium glycerophosphate precipitated and washed with alcohol.

Tonic. Dose, 250 mg.

CALCII HYDROXIDUM

Pharmacopœial only as liquor calcis. (See page 337.)

CALCII HYPOPHOSPHIS—Calcium Hypophosphite—**Calc. Hypophos.**—*Hypophosphite of Lime*

Contains, when dried over sulphuric acid, not less than 98 per cent. of $Ca(PH_2O_2)_2$ (170.18).

Permanent in the air. Preserve in well-closed containers. Explosions are liable to occur if it is triturated or heated with nitrates, chlorates, or other oxidizing agents.

Colorless, transparent, monoclinic prisms, small lustrous scales, or white crystalline powder; odorless; nauseous, bitter taste.

Neutral or slightly acid to litmus. Soluble in 6.5 mils of water; insoluble in alcohol.

Obtained by warming to 40° C. a mixture of milk of lime and finely divided phosphorus, filtering, and evaporating at a low temperature until a granular product results.

$$3Ca(OH)_2 + 8P + 6H_2O = 3Ca(P(OH)_2)_2 + 2PH_3$$

An ingredient in syrup of hypophosphites, 4.5 g/m.

Reconstructive. Dose, 0.5 gm.

CALCII LACTAS (IX)—Calcium Lactate—Calc. Lact.

Hydrated calcium lactate, $Ca(C_3H_5O_3)_2 + 5H_2O$ (308.23), containing, when dried at 120° C., not less than 98 per cent. $Ca(C_3H_5O_3)_2$ (218.15).

Somewhat efflorescent. Preserve in well-closed containers.

White granular masses or powder; odorless; nearly tasteless.

Neutral, slightly acid or slightly alkaline to litmus. Soluble in 20 mils of water; almost insoluble in alcohol.

Obtained by dissolving calcium carbonate in warm diluted lactic acid, filtering while hot, and crystallizing. Also as an intermediate product in the manufacture of lactic acid.

Nervine, reconstructive. Dose, 0.5 gm.

CALCII LACTOPHOSPHAS, N.F.—Calcium Lactophosphate—Calc. Lactophos.

A mixture in variable proportions of calcium lactate, calcium acid lactate, and calcium acid phosphate.

Hygroscopic. Preserve in well-closed containers.

White powder or granules; odorless; mildly acid taste.

Acid to litmus. Soluble in water; almost insoluble in alcohol.

Obtained by mixing calcium carbonate 15 parts, lactic acid 30 parts, phosphoric acid 9.86 parts, distilled water 150 parts, and evaporating to dryness in a warm place or over sulphuric acid, but not on a water-bath.

Stomachic, tonic. Dose, 0.5 gm.

CALCII PHOSPHAS PRÆCIPITATUS, N. F., U. S. P. VIII—Precipitated Calcium Phosphate—**Calc. Phos. Præc.**—*Tricalcium Phosphate; Calcium Phosphate; Precipitated Phosphate of Lime; Phosphate of Calcium*

Calcium phosphate, $Ca_3(PO_4)_2$ (310.29), losing at 200° C. not more than 4 per cent. of moisture.

Permanent in the air.

White, bulky powder; odorless; tasteless.

Neutral to litmus. Practically insoluble in simple solvents.

Obtained by dissolving the calcium phosphate in bone-ash, in hydrochloric acid, precipitating the filtered solution with ammonia-water, and washing and drying the precipitate.

$$Ca_3(PO_4)_2 + 4HCl = CaH_4(PO_4)_2 + 2CaCl_2$$
$$CaH_4(PO)_2 + 2CaCl_2 + 4NH_4OH = Ca_3(PO_4)_2 + 4NH_4Cl + 4H_2O$$

Used as a distributing agent, as in Pulv. Antimonialis, N. F.

Tonic. Dose, 1 gm.

CALCII SULPHIDUM CRUDUM—Crude Calcium Sulphide—**Calc. Sulphid. Crud.**—*Sulphurated Lime; Calx Sulphurata,* U. S. P. VIII

Contains not less than 55 per cent. CaS (72.14).

Gradually decomposes when exposed to air. Preserve in well-closed containers.

Pale gray or yellowish powder; faint odor of hydrogen sulphide; nauseous, alkaline taste.

Alkaline to litmus. Slightly soluble in water; insoluble in alcohol.

Obtained (U. S. P. VIII process) by heating a mixture of 70 parts dried calcium sulphate, 10 parts of charcoal, and 2 parts of starch in a crucible to bright redness until the mixture has lost its black color, cooling, and powdering.

Essentially,

$$CaSO_4 + C_2 + \Delta = CaS + 2CO_2$$

Externally, depilatory. Internally, alterative.

Dose, 60 mg.

CALX—Calcium Oxide—**Calx**—*Lime; Quicklime; Burned Lime; Unslaked Lime*

Contains, when freshly ignited to constant weight with a blast lamp, not less than 95 per cent. of CaO (56.07), and loses not less than 10 per cent. of its weight on ignition.

Slowly absorbs moisture and carbon dioxide from the air and falls to a white powder (slakes). Should be kept in well-closed containers.

Hard, white, or grayish-white masses; odorless; caustic taste.

Alkaline to litmus. Soluble in about 840 mils of water; insoluble in alcohol.

Obtained by calcining limestone or marble ($CaCO_3$).

$$CaCO_3 + \triangle = CaO + CO_2$$

It is of great value, commercially, in the production of cement and plaster.

Used in making lime-water and precipitated sulphur.

In dilute solution (lime-water) it is antacid. In the unslaked condition it is escharotic. It is not administered internally, as lime.

CALX CHLORINATA—Chlorinated Lime—**Calx Chlorin.**—*"Chloride of Lime"; Hypochlorite of Lime; Bleaching Powder; Oxymuriate of Lime; Calcium Hypochlorite*

Contains not less than 30 per cent. of available chlorine, Cl (35.46).

Hygroscopic; decomposes upon exposure to air. Preserve in air-tight containers in a cool, dry place.

White or grayish-white granular powder, having the odor of chlorine.

Alkaline to litmus, then bleaches. Partially soluble in water and alcohol.

Obtained by exposing slaked lime in thin layers on trays to the action of chlorine.

$$2Ca(OH)_2 + 2Cl_2 = 2CaOCl_2 + 2H_2O$$

Valuable bleach and disinfectant. Used in preparing solution of chlorinated soda, 10 per cent.

CARBONEUM—Carbon—C. (12)

Represented pharmacopœially by Carbo Ligni, by Carbo Animalis, U. S. P. VIII, and Carbo Animalis Purificatus, U. S. P. VIII.

CARBO ANIMALIS, U. S. P. VIII—Animal Charcoal—*Bone Black; Ivory Black; Spodium; Ebur Ustum*

Permanent in the air; usually occurs as a dull, black powder or granular fragments; contains about 85 per cent. of mineral matter; odorless and nearly tasteless; insoluble in simple solvents, but yields considerable mineral matter to acid liquids.

Obtained by carbonizing bones or blood.

Used in preparing the purified animal charcoal, U. S. P. VIII.

Without therapeutic value; extensively used as a decolorizing agent for neutral or slightly alkaline solutions.

CARBO ANIMALIS PURIFICATUS, U. S. P. VIII—Purified Animal Charcoal

Permanent in the air, but should be kept in well-closed containers. A dull black powder, odorless and tasteless; insoluble in all simple solvents.

Prepared from animal charcoal, in No. 60 powder, by boiling it for several hours with two successive portions of hydrochloric acid, and then washing the residue until free from chlorides. This process removes from 80 to 85 per cent. of mineral matter, chiefly calcium phosphate.

Has no therapeutic value; used quite extensively as a decolorizing agent, especially for acid solutions and where traces of extracted mineral matter would be objectionable.

CARBO LIGNI—Wood Charcoal—**Carbo Lig.**—*Charcoal; Wood Charcoal; Vegetable Charcoal; Willow Charcoal*

Preserve in well-closed containers.

Black, fine powder, free from gritty particles; tasteless; odorless.

Insoluble in simple solvents.

Obtained from soft, non-resinous wood, such as willow or poplar, by carbonization. The yield is 14 to 25 per cent. based on unseasoned wood.

Absorbent, used in the treatment of dyspepsia and flatulency.

Dose, 1 gm.

CERII OXALAS—Cerium Oxalate—**Cerii Oxal.**—*Oxalate of Cerium; Cerous Oxalate*

A mixture of the oxalates of cerium, didymium, lanthanum, and other associated elements.

Permanent in the air.

White or slightly pinkish, fine powder; odorless; tasteless.

Insoluble in water and alcohol.

Obtained as a by-product in the manufacture of thorium salts from the ore monazite. It was formerly made from the mineral cerite, a silicate of cerium, lanthanum, and didymium.

Claimed to be a valuable remedy in the vomiting of pregnancy.

Dose, 200 mg.

CHLORUM (**Unofficial**)—Chlorine

Officially represented by Calx Chlorinata (see page 121) and Liquor Sodæ Chlorinatæ (see page 345).

A greenish-yellow, incombustible gas; peculiar suffocating odor, extremely irritating to the mucous membrane of the respiratory organs. Soluble in about half its volume of water. A saturated, aqueous solution contains about 0.4 per cent. of chlorine.

Obtained by heating a mixture of manganese dioxide and hydrochloric acid:

$$MnO_2 + 4HCl = MnCl_4 + 2H_2O \quad MnCl_4 = Cl_2 + MnCl_2$$

Also by heating a mixture of manganese dioxide, sodium chloride, and sulphuric acid:

$$MnO_2 + 4NaCl + 2H_2SO_4 = Cl_2 + MnSO_4 + Na_2SO_4 + 2H_2O$$

It is prepared on a large scale as a by-product in the manufacture of sodium hydroxide by electrolyzing a solution of sodium chloride. Conveniently prepared in the form of a solution by gently warming a mixture of potassium chlorate and hydrochloric acid:

$$2KClO_3 + 4HCl = \underset{\text{Euchlorine.}}{(Cl_2 + 2ClO_2)} + 2KCl + 2H_2O$$

Used commercially as a bleaching agent.

Disinfectant. Not used internally.

CHROMII TRIOXIDUM—Chromium Trioxide—**Chrom. Triox.** —*Chromic Acid; Chromic Anhydride; Anhydrous Chromic Acid*

Contains not less than 95 per cent. of CrO_3 (100).

Chromium trioxide is not basic, but is the anhydride of chromic acid.

Very deliquescent, rapidly deoxidized by organic matter. Preserve in glass-stoppered bottles.

Small, needle-shaped, dark purplish crystals; odorless; destructive to animal and vegetable tissues.

Very soluble in water. When brought in contact with organic solvents, such as alcohol, glycerin, etc., it is decomposed sometimes with explosive violence.

Obtained by the action of concentrated sulphuric acid upon potassium dichromate.

$$K_2Cr_2O_7 + 2H_2SO_4 = 2CrO_3 + 2KHSO_4 + H_2O$$

Germicide, escharotic. Not used internally.

CRETA PRÆPARATA—Prepared Chalk—**Cret. Præp.**—*Drop Chalk; Levigated Chalk*

Native form of calcium carbonate containing, when dried at 200° C., not less than 97 per cent. of $CaCO_3$ (100.07).

Permanent in the air.

White or grayish-white, very fine, amorphous powder, often formed into "conical drops"; odorless; tasteless.

Almost insoluble in water; insoluble in alcohol.

Obtained from native chalk deposits, which consist mainly of the microscopic shells of foraminifera, by the processes of levigation, elutriation, and trochiscation.

A commercial variety prepared with less care is known as "whiting."

Used in metal polishes, etc.

An ingredient in mercury with chalk, 57 per cent.; compound chalk powder, 30 per cent., *q. v.*

Antacid. Dose, 1 gm.

CUPRI SULPHAS—Copper Sulphate—**Cupr. Sulph.**—*Cupric Sulphate; Blue Vitriol; Roman Vitriol; Blue Stone*

Contains 62.97 to 66.79 per cent. of anhydrous copper sulphate, $CuSO_4$ (159.64), corresponding to not less than 98.5 per cent. of the crystallized salt, $CuSO_4 + 5H_2O$ (249.72).

Slowly efflorescent in dry air. Preserve in well-closed containers.

Deep blue, triclinic crystals, or blue granular powder; odorless; nauseous, metallic taste.

Acid to litmus. Soluble in 2.5 mils of water and in 500 mils of alcohol.

Obtained as a by-product in the refining of gold and silver. May be prepared by dissolving metallic copper in a mixture of dilute nitric and sulphuric acids, evaporating, and crystallizing.

$$3Cu + 3H_2SO_4 + 2HNO_3 = 3CuSO_4 + 2NO + 4H_2O$$

Astringent, emetic, styptic, nervine. Dose: emetic, 250 mg.; astringent, about 10 mg.

ELEMENTA—ELEMENTS

The pharmaceutically important free elements are:

Bromum (N. F.), (U. S. P. VIII).
Carboneum, as Carbo Ligni.
Chlorum, represented by
  Calx Chlorinata, etc.
Ferrum and Ferrum Reductum.
Hydrargyrum.
Iodum.
Oxygenium (IX).
Phosphorus.
Sulphur, as
  Sulphur Lotum,
  Sulphur Præcipitatum,
  Sulphur Sublimatum.
Zincum.

FERRI CARBONAS SACCHARATUS—Saccharated Ferrous Carbonate—**Ferr. Carb. Sacch.**—*Saccharated Iron Carbonate*

Contains not less than 15 per cent. of $FeCO_3$ (115.84).

Gradually becomes oxidized upon exposure to air. Preserve in small, well-stoppered bottles, exposed to light.

Greenish-brown powder; odorless; sweetish, afterward slightly ferruginous taste.

Only partially soluble in simple solvents.

Prepared by precipitating a solution of ferrous sulphate with sodium bicarbonate, washing the resulting precipitate of ferrous carbonate by decantation with hot water until nearly free from sulphates, then mixing the moist mass with sugar and evaporating to dryness upon the water-bath.

$$FeSO_4 + 2NaHCO_3 = FeCO_3 + Na_2SO_4 + CO_2 + H_2O$$

Chalybeate. Dose, 250 mg.

FERRI CHLORIDUM—Ferric Chloride—**Ferr. Chlor.**—*Iron Perchloride; Sesquichloride of Iron; Perchloride of Iron; Chloride of Iron*

A hydrated chloride of iron, approximately $FeCl_3 + 6H_2O$ (270.32), corresponding to not less than 20 per cent. of Fe (55.84).

Very deliquescent. Preserve in well-closed glass containers.

Orange-yellow, crystalline pieces; odorless or having a faint odor of hydrochloric acid; strongly styptic taste.

Slightly acid to litmus. Soluble in 0.2 mil of water; freely soluble in alcohol.

Obtained by dissolving a given weight of iron in sufficient hydrochloric acid, oxidizing the solution with nitric acid, evaporating to a definite weight, and allowing the solution to cool and solidify.

$$Fe + 2HCl = FeCl_2 + H_2$$
$$3FeCl_2 + HNO_3 + 3HCl = 3FeCl_3 + NO + 2H_2O$$

Externally, styptic; internally, tonic. Dose, 60 mg.

FERRI ET AMMONII CITRAS—Iron and Ammonium Citrate—**Ferr. et Ammon. Cit.**—*Soluble Ferric Citrate; Ammonio-ferric Citrate; Citrate of Iron and Ammonium; Soluble Citrate of Iron*

Contains ferric citrate corresponding to 16 to 18 per cent. of Fe (55.84).

Deliquescent in moist air. Preserve in well-closed containers, protected from light.

Garnet red, thin, transparent scales; odorless; saline, mildly ferruginous taste.

Neutral or but slightly acid or alkaline to litmus. Readily and completely soluble in water; insoluble in alcohol.

Obtained by adding ammonia-water to solution of ferric citrate, evaporating at a temperature not above 60° C. to a thin syrupy consistence, and then pouring upon glass plates to scale.

It is used in making blue prints.

Ferruginous tonic. Dose, 250 mg.

FERRI ET QUININÆ CITRAS—Iron and Quinine Citrate—**Ferr. et Quin. Cit.**—*Ferri et Quininæ Citras Solubilis,* U. S. P. VIII; *Soluble Iron and Quinine Citrate*

Contains not less than 11.5 per cent. of anyhdrous quinine, $C_{20}H_2O_{24}N_2$ (324.21), and not less than 13 per cent. of Fe (55.84).

Deliquescent. Preserve in amber-colored, well-stoppered bottles, protected from light.

Greenish or golden yellow, thin, transparent scales; odorless; bitter, mildly ferruginous taste.

Acid to litmus. Rapidly and completely soluble in water; partially soluble in alcohol.

Obtained by adding to a solution of ferric citrate, citric acid and quinine, sufficient ammonia-water to redissolve the precipitate at first formed, and give a greenish-yellow tint to the solution; evaporating and scaling the product on glass plates.

Tonic, astringent, antiperiodic. Dose, 250 mg.

FERRI GLYCEROPHOSPHAS, N. F.—Ferric Glycerophosphate—**Ferr. Glycerophos.**—*Ferric Glycerinophosphate; Iron Glycerophosphate*

Contains a variable quantity of $Fe_2(C_3H_7O_6P)_3$ (621.97), corresponding to 14 to 16 per cent. of Fe (55.84).

Preserve in well-closed containers, protected from light.

Yellowish-green, transparent, amorphous scales or a greenish-yellow powder; odorless; nearly tasteless.

Acid to litmus. Soluble in 2 mils of water; insoluble in alcohol.

Obtained by dissolving ferric hydroxide in glycerophosphoric acid, evaporating, and scaling.

Tonic. Dose, 200 mg.

FERRI HYDROXIDUM, U. S. P. VIII

See *Magma Ferri Hydroxidi,* N. F., page 348.

FERRI HYDROXIDUM CUM MAGNESII OXIDO—Ferric Hydroxide with Magnesium Oxide—**Ferr. Hydrox. cum Mag. Oxid.**—*Arsenic Antidote; Ferric Hydrate with Magnesia; Antidote to Arsenious Acid*

Prepared extemporaneously.

It is desirable to keep the components in two bottles, so that the contents can be mixed quickly when occasion demands. In one bottle place 40 mils of solution of ferric sulphate diluted with 125 mils of water. In another bottle, which should be of about 1000 mils capacity, place 10 gm. of magnesium oxide, which has previously been rubbed to a smooth paste, and dilute it to about 750 mils with water. When needed, shake the magnesium oxide mixture to a thin magma, and slowly add to it the ferric sulphate solution and shake them thoroughly until a smooth, uniform mixture results.

Used solely as an arsenic antidote. Dose, 120 mils.

FERRI HYPOPHOSPHIS, N. F., U. S. P. VIII—Ferric Hypophosphite—**Ferr. Hypophos.**—*Hypophosphite of Iron*

Contains not less than 98 per cent. of $Fe(PH_2O_2)_3$ (251.01), corresponding to not less than 21.8 per cent. of Fe (55.84).

Permanent in the air. Preserve in well-closed containers.

White or grayish-white powder; odorless; nearly tasteless.

Neutral in reaction. Soluble in 2300 mils of water.

Obtained by precipitating a solution of calcium hypophosphite with ferric chloride, collecting, washing, and drying the precipitate.

$$3Ca(PH_2O_2)_2 + 2FeCl_3 = 2Fe(PH_2O_2)_3 + 3CaCl_2$$

An ingredient in compound syrup of hypophosphites, N. F., 0.225 g/m.

Chalybeate, reconstructive. Dose, 200 mg.

FERRI LACTAS, N. F.—Ferrous Lactate—**Ferr. Lact.**—*Iron Lactate*

Contains not less than 97 per cent. of $Fe(C_3H_5O_3)_2 + 3H_2O$ (287.98).

Preserve in well-closed containers.

Greenish-white, crystalline powder or masses; slight, characteristic odor; mild, sweet, ferruginous taste.

Slightly acid to litmus. Almost completely soluble in 40 mils of water; almost insoluble in alcohol.

Obtained by digesting iron filings in lactic acid, evaporating, and crystallizing; or by double decomposition between calcium lactate and ferrous sulphate, removing calcium sulphate by addition of alcohol, evaporating, and crystallizing.

$$Fe + 2H(C_3H_5O_3) = Fe(C_3H_5O_3)_2 + H_2$$

Also

$$Ca(C_3H_5O_3)_2 + FeSO_4 = Fe(C_3H_5O_3)_2 + CaSO_4$$

Ferruginous tonic, least astringent of the iron salts.

Dose, 300 mg.

FERRI OXIDUM SACCHARATUM, N. F.—Saccharated Ferric Oxide—**Ferr. Oxid. Sacch.**—*Soluble Ferric Oxide; Ferrum Oxydatum Saccharatum; Eisenzucker*

Contains the equivalent of not less than 2.8 per cent. of Fe (55.84).

Preserve in well-closed containers.

Reddish-brown powder; almost odorless; sweet, slightly astringent taste.

Slightly alkaline to litmus. Soluble in about 20 mils of hot water.

Prepared by dissolving a well-washed, freshly precipitated ferric hydroxide (produced by precipitating a definite weight of solution of ferric chloride with monohydrated sodium carbonate) in a saccharine solution of sodium hydroxide, evaporating the resulting solution to dryness, and adjusting the final weight by adding sufficient sugar to make it weigh 100 gm. for each 30 gm. of solution of ferric chloride employed.

Ferruginous tonic. Dose, 0.5 to 2 gm.

FERRI PHOSPHAS—Ferric Phosphate—**Ferr. Phos.**—*Ferri Phosphas Solubilis*, U. S. P. VIII*; Soluble Ferric Phosphate*

Contains ferric phosphate equivalent to 12 per cent. of Fe (55.84).

Permanent in dry air, discolored by light. Preserve in amber-colored bottles, protected from light.

Bright green, thin, transparent scales; odorless; acidulous, slightly saline taste.

Slightly acid to litmus. Freely and completely soluble in water; insoluble in alcohol.

Obtained by mixing solutions of ferric citrate and sodium phosphate, evaporating to syrupy consistence, and scaling. The ferric phosphate is rendered soluble by the sodium citrate.

Astringent and chalybeate. Dose, 250 mg.

FERRI PYROPHOSPHAS, N. F.—Ferric Pyrophosphate—**Ferr. Pyrophos.**—*Ferri Pyrophosphas Solubilis,* U. S. P. VIII*; Soluble Ferric Pyrophosphate*

Contains ferric pyrophosphate, corresponding to not less than 10 per cent. of Fe (55.84).

Permanent in dry air, discolored by light. Preserve in well-closed containers, protected from light.

Apple-green, thin, transparent scales; odorless; acidulous, slightly saline taste.

Slightly acid to litmus. Freely and completely soluble in water; insoluble in alcohol.

Obtained by mixing solutions of ferric citrate and sodium pyrophosphate, evaporating to syrupy consistence, and scaling. The ferric pyrophosphate is rendered soluble by the sodium citrate.

Ferruginous tonic, astringent. Dose, 250 mg.

FERRI SULPHAS—Ferrous Sulphate—**Ferr. Sulph.**—*Iron Protosulphate; Sulphate of Iron; Green Vitriol; Copperas*

Contains 54.36 to 57.07 per cent. of anhydrous ferrous sulphate, corresponding to 99.5 per cent. of the crystallized salt, $FeSO_4 + 7H_2O$ (278.02).

Efflorescent, becomes oxidized and coated with a brownish-yellow, basic ferric sulphate when exposed to the air. When thus deteriorated it must not be used for any official purpose. Preserve in well-closed containers.

Pale, bluish-green, monoclinic prisms; odorless; saline, styptic taste.

Acid to litmus. Soluble in 1.4 mils of water; insoluble in alcohol.

Obtained by dissolving iron in dilute sulphuric acid, evaporating, and crystallizing.

$$Fe + H_2SO_4 = FeSO_4 + H_2$$

Also by exposing iron pyrites and scrap iron to the air, extracting with water, evaporating, and crystallizing.

$$FeS_2 + Fe + 4O_2 = 2FeSO_4$$

Used commercially as a base for inks and in dying black.

Officially used in preparing exsiccated ferrous sulphate; granulated ferrous sulphate; mass of ferrous carbonate, 100 per cent.; saccharated ferrous carbonate, 50 per cent.; solution of ferric subsulphate, 67.5 per cent.; solution of ferric sulphate, 50 per cent.

Tonic, astringent, chalybeate. Dose, 100 mg.

FERRI SULPHAS EXSICCATUS—Exsiccated Ferrous Sulphate—**Ferr. Sulph. Exsic.**—*Dried Ferrous Sulphate; Dried Sulphate of Iron*

Contains the equivalent of not less than 80 per cent. of the anhydrous salt, $FeSO_4$ (151.91).

Preserve in well-stoppered bottles.

Grayish-white powder; odorless; warm, saline, styptic taste.

Slowly soluble in water; insoluble in alcohol.

Prepared by exsiccating 100 gm. of ferrous sulphate until the weight is reduced to 64 to 65 gm.

Usually administered in pills in preference to the crystallized salt, being less bulky.

Tonic, astringent, chalybeate. Dose, 60 mg.

FERRI SULPHAS GRANULATUS—Granulated Ferrous Sulphate—**Ferr. Sulph. Gran.**—*Precipitated Ferrous Sulphate; Precipitated Sulphate of Iron*

Contains 54.36 to 57.07 per cent. of anhydrous ferrous sulphate, corresponding to 99.5 per cent. of the crystallized salt, $FeSO_4 + 7H_2O$ (278.02).

Efflorescent. Preserve in well-stoppered bottles.

Pale, bluish-green, crystalline powder; odorless; saline, styptic taste.

Soluble in 1.4 mils of water; insoluble in alcohol.

Prepared from ferrous sulphate by granulation. Ferrous sulphate is dissolved in an equal weight of boiling water to which a little diluted sulphuric acid has been added, the solution evaporated until it weighs 1.5 gm. for each gram ferrous sulphate taken, and cooled quickly, stirring constantly; washed with alcohol, dried, and bottled.

Used in making pills of ferrous carbonate, 16 g/n.

Tonic, astringent, chalybeate. Dose, 100 mg.

FERRUM—Iron—**Ferr.**—*Fer; Mars*

Fe (55.84).

Permanent in dry air. For pharmaceutic purposes it is preferred in the form of fine, bright, non-elastic wire; sp. gr., about 7.8; m. p., 1500 to 1600° C. (m. p. for cast iron, 1050 to 1200° C.). Insoluble in simple solvents.

Obtained from iron ore, chiefly Fe_2O_3, by heating it in a blast furnace with coal and a suitable flux. The molten iron which collects under the slag is drawn off at the bottom of the furnace into molds of sand. Thus prepared, it is known commercially as pig iron, and must be further purified before it is suitable for pharmaceutic purposes.

$$2Fe_2O_3 + 3C + \triangle = Fe + 3CO_2$$

Iron is used in making the solution of ferric chloride.

Not administered internally; see *Ferrum Reductum.*

FERRUM REDUCTUM—Reduced Iron—**Ferr. Reduct.**—*Iron by Hydrogen; Quevenne's Iron; Powdered Iron; Ferrum Redactum*

Contains not less than 90 per cent. of metallic iron (Fe = 55.84).

Oxidizes very rapidly in contact with moisture-charged air. Should be kept in well-stoppered bottles.

Fine, grayish-black, lusterless powder, without odor or taste.

Insoluble in simple solvents.

Obtained from ferric hydroxide or from subcarbonate of iron. The ferric hydroxide is prepared by precipitating a solution of ferric sulphate with ammonia-water and washing and drying the precipitate. This or freshly prepared subcarbonate of iron is then introduced into an iron tube and heated to dull redness in a current of hydrogen gas. When the hydrogen gas ceases to be absorbed, the reduced iron is allowed to cool in the hydrogen to prevent reoxidation and bottled.

$$2Fe(OH)_3 + \Delta = Fe_2O_3 + 3H_2O$$
$$Fe_2O_3 + 6H + \Delta = 2Fe + 3H_2O$$

Used in preparing the pills of ferrous iodide, 4 g/n.

Chalybeate. Dose, 60 mg.

HYDRARGYRI CHLORIDUM CORROSIVUM—Corrosive Mercuric Chloride—**Hydrarg. Chlor. Corr.**—*Bichloride of Mercury; Corrosive Sublimate; Mercuric Chloride; Perchloride of Mercury; Corrosive Chloride of Mercury; Bichloride*

Contains, when dried over sulphuric acid, not less than 99.5 per cent. $HgCl_2$ (271.52).

Permanent in the air. Preserve in well-closed containers.

Colorless, heavy, rhombic crystals, or crystalline masses, or a white powder; odorless; characteristic, persistent metallic taste. Caution: Poison.

Acid to litmus. Sodium chloride renders it neutral and increases the solubility in water. Soluble in 13.5 mils of water, in 3.8 mils of alcohol, and in 12 mils of glycerin.

Obtained from mercury by first converting it into mercuric sulphate, then subliming with sodium chloride and purifying by recrystallization:

$$Hg + 2H_2SO_4 + \Delta = HgSO_4 + SO_2 + 2H_2O$$
$$HgSO_4 + 2NaCl + \Delta = HgCl_2 + Na_2SO_4$$

An ingredient in poison tablets of corrosive mercuric chloride, 50 g/n.

Antiseptic, alterative, antisyphilitic germicide. Dose, 3 mg.

HYDRARGYRI CHLORIDUM MITE—Mild Mercurous Chloride—**Hydrarg. Chlor. Mit.**—*Mercurous Chloride; Calomel; Protochloride of Mercury; Subchloride of Mercury; Mercurius Dulcis; Submuriate of Mercury; Aquila Alba*

Contains, when dried to constant weight over sulphuric acid, not less than 99.6 per cent. HgCl (236.06).

Permanent in the air. Preserve in well-closed containers, protected from light.

White, impalpable, heavy powder, becoming yellowish when triturated; odorless and tasteless.

Insoluble in simple solvents.

Obtained by subliming a mixture of mercuric chloride or sulphate, mercury, and sodium chloride.

When the calomel vapor is caused to come in contact with steam in a large chamber it is condensed as an impalpable powder and at the same time washed free from traces of corrosive mercuric chloride. A current of cold air injected into the receiving chamber will also condense the vapors of calomel as a soft powder similar to that produced by steam.

$$HgSO_4 + Hg + 2NaCl + \triangle = 2HgCl_2 + Na_2SO_4$$

An ingredient in compound cathartic pills, 6 g/n.

Cathartic, alterative, diuretic, antiseptic, anthelmintic.

Dose: laxative, 150 mg.; alterative, 15 mg.

HYDRARGYRI IODIDUM FLAVUM—Yellow Mercurous Iodide—**Hydrarg. Iod. Flav.**—*Mercurous Iodide; Protoiodide of Mercury; Yellow Iodide of Mercury; Green Iodide of Mercury*

Contains, when dried over sulphuric acid, not less than 99 per cent. of HgI (327.52).

By exposure to light it becomes greenish in proportion to the decomposition which it undergoes, changing into metallic mercury and mercuric iodide. Preserve in well-closed containers, protected from light.

Bright, yellow, amorphous powder, odorless; tasteless.

Almost insoluble in water; insoluble in alcohol.

Obtained by precipitating a solution of mercurous nitrate with the proper quantity of potassium iodide, collecting, and washing the precipitate.

$$6Hg + 8HNO_3 = 6HgNO_3 + 2NO + 4H_2O$$
$$HgNO_3 + KI = HgI + KNO_3$$

Alterative, antisyphilitic. Dose, 10 mg.

HYDRARGYRI IODIDUM RUBRUM—Red Mercuric Iodide—**Hydrarg. Iod. Rub.**—*Biniodide of Mercury; Mercuric Iodide; Red Iodide of Mercury; Deutoiodide of Mercury*

Contains, when dried to constant weight over sulphuric acid, not less than 99 per cent. of HgI_2 (454.44).

Permanent in the air. Preserve in well-closed containers, protected from light.

Scarlet-red, amorphous powder; odorless; nearly tasteless.

Almost insoluble in water; soluble in 115 mils of alcohol.

Obtained by precipitating a solution of mercuric chloride with the proper quantity of potassium iodide, collecting, and washing the precipitate.

$$HgCl_2 + 2KI = HgI_2 + 2KCl$$

An ingredient in the solution of arsenous and mercuric iodide, 1 per cent.

Alterative, antisyphilitic. Dose, 3 mg.

HYDRARGYRI OXIDUM FLAVUM—Yellow Mercuric Oxide—**Hydrarg. Oxid. Flav.**—*Yellow Oxide of Mercury; Precipitated Oxide of Mercury; Mercuric Oxide*

Contains, when dried to constant weight at 150° C., not less than 99.5 per cent. of HgO (216.60).

Permanent in the air, but darkens upon exposure to light; should be kept in well-stoppered, amber-colored bottles.

Heavy, light orange-yellow, amorphous, impalpable powder; odorless and having a somewhat metallic taste.

Neutral to litmus. Almost insoluble in water; insoluble in alcohol.

Obtained by precipitating a solution of corrosive mercuric chloride with sodium hydroxide (in the case of mercury this precipitates the oxide instead of the hydroxide), collecting, and washing the precipitate.

$$HgCl_2 + 2NaOH = HgO + 2NaCl + H_2O$$

Used in making the oleate of mercury, 25 per cent.

An ingredient in ointment of yellow mercuric oxide, 10 per cent.

Stimulant, antiseptic. Used externally.

HYDRARGYRI OXIDUM RUBRUM—Red Mercuric Oxide—**Hydrarg. Oxid. Rub.**—*Red Precipitate; Red Oxide of Mercury*

Contains, when dried to constant weight at 150° C., not less than 99.5 per cent. HgO (216.60).

Permanent in the air; preserve in well-closed containers, protected from light.

Heavy, orange-red, crystalline scales, or in a crystalline powder; odorless and having a somewhat metallic taste.

Almost insoluble in water; insoluble in alcohol.

Obtained by decomposing mercuric nitrate by heat.

$Hg(NO_3)_2 + \triangle = HgO + 2NO_2 + O$ or to avoid loss of oxygen

$$Hg(NO_3)_2 + Hg + \triangle = 2HgO + 2NO_2$$

Stimulant, antiseptic. Used externally.

HYDRARGYRI SALICYLAS (IX)—Mercuric Salicylate—**Hydrarg. Salicyl.**—*Mercuric Subsalicylate; Basic Mercuric Salicylate*

A compound of mercury and salicylic acid, approximately $C_6H_4OCOOHg$ (336.63), corresponding to 54 to 59.5 per cent. of Hg. (200.6).

Preserve in well-closed containers, protected from light.

White, slightly yellowish or slightly pinkish powder; odorless; tasteless.

Nearly insoluble in water and alcohol.

Obtained by heating together on a water-bath with agitation freshly precipitated yellow oxide of mercury, water, and salicylic acid until the mixture is perfectly white, collecting the precipitate, and washing it with water until free from acid.

Mercuric salicylate is an organic-metallic compound in which the mercury is so modified that it is not blackened by the usual reagents, H_2S or $(NH_4)HS$.

Antiseptic, antisyphilitic. Dose, 4 mg.

HYDRARGYRUM—Mercury—**Hydrarg.**—*Quicksilver*

Contains not less than 99.5 per cent. of Hg. (200.6).

Nearly permanent in the air. Best kept in strong well-stoppered bottles.

Heavy, shining, silver-white liquid; sp. gv., about 13.5; b. p., about 358° C. Without odor or taste.

Insoluble in simple solvents.

Obtained chiefly from the native sulphide (cinnabar).

This ore is decomposed by heating it in the presence of air, the sulphur passing off in the form of SO_2. The mercury is volatilized at the same time, but condenses at a lower temperature than the sulphur dioxide.

$$HgS + O_2 + \Delta = Hg + SO_2$$

Also obtained by distilling a mixture of the ore with lime. The mercury distils over, leaving the calcium sulphide and calcium sulphate behind:

$$4HgS + 4CaO = 4Hg + 3CaS + CaSO_4$$

Used in preparing the ointment of mercuric nitrate and yellow mercurous iodide.

An ingredient in the following: Mercurial plaster, 30 per cent., U. S. P. VIII; mercury with chalk, 38 per cent.; mass of mercury, 33 per cent.; mercurial ointment, 50 per cent.; diluted mercurial ointment, 30 per cent.

When finely divided, as in the above preparations, it is antiseptic and laxative. Dose, about 60 mg.

HYDRARGYRUM AMMONIATUM—Ammoniated Mercury—**Hydrarg. Ammon.**—*White Precipitate; Mercuric Ammonium Chloride; Mercuric Amido Chloride*

Contains mercurammonium chloride, $HgNH_2Cl$ (252.09), corresponding to 78 to 80 per cent. of Hg (200.6).

Permanent in the air. Preserve in well-closed containers, protected from light.

White, pulverulent pieces, or a white amorphous powder; odorless; earthy, styptic, metallic taste.

Insoluble in water and alcohol.

Obtained by precipitating a solution of corrosive mercuric chloride with ammonia-water, collecting, and washing the precipitate.

$$HgCl_2 + NH_4OH = HgNH_2Cl + HCl + H_2O$$

An ingredient in ointment of ammoniated mercury, 10 per cent.

Antiseptic, alterative. Used externally.

HYDRARGYRUM CUM CRETA—Mercury with Chalk—**Hydrarg. cum Cret.**—*Gray Powder*

Contains 37 to 39 per cent. of Hg (200.6).

Preserve in well-closed containers, protected from light.

Light-gray, rather damp powder, free from grittiness; odorless; slightly sweet taste.

Neutral to litmus. Only partially soluble in water and alcohol.

Prepared by intimately mixing by agitation metallic mercury (38 gm.) with clarified honey (10 gm.) and water (2 mils) until the globules of mercury are no longer visible under a lens magnifying 4 diameters; then mixing intimately with prepared chalk (57 gm.), smoothed with water until a uniform mixture results, then drying between folds of bibulous paper, and lastly, by exposure to the air at the ordinary temperature until the weight is reduced to 100 gm.

Purgative, cholagogue, antisyphilitic. Dose, 250 mg.

HYDROXIDA—HYDROXIDES—BASES

General Methods for Preparing Hydroxides.—Hydroxides of the alkali metals may be prepared by decomposing water with the respective metal, and evaporating the resulting solution to dryness.

Also formed by decomposing their respective carbonates in solution, with milk of lime, separating the clear solution from the precipitated calcium carbonate, and evaporating it to dryness. Potassium hydroxide (see page 156).

Soluble or sparingly soluble hydroxides may be prepared by adding water to the respective oxide. Calcium hydroxide (see page 337).

Insoluble hydroxides are best prepared by precipitation, using a soluble salt of the metal and an appropriate soluble hydroxide as the precipitant. Ferric hydroxide (see page 348).

The pharmaceutically important hydroxides are:

- Alumini Hydroxidum.
- Ammonii Hydroxidum, as Aqua Ammoniæ, etc.
- Bismuthi Hydroxidum, as Magma Bismuthi.
- Calcii Hydroxidum, as Liquor Calcis.
- Ferri Hydroxidum, as Magma Ferri Hydroxidi, N. F.
- Ferri Hydroxidum cum Magnesii Oxido.
- Magnesii Hydroxidum, as Magma Magnesiæ.
- Potassii Hydroxidum.
- Sodii Hydroxidum.

IODUM—Iodine

Contains not less than 99.5 per cent. of I (126.92).

Volatile solid; should be kept in glass-stoppered, amber-colored bottles.

Heavy, bluish-black, rhombic plates having a metallic luster; sp. gv., about 4.66 at 17° C.; m. p., about 114° C.; distinctive odor; sharp, acrid taste.

Soluble in 2950 mils of water, 12.5 mils of alcohol, and 80 mils of glycerin.

Obtained principally from the mother liquors of Chili saltpeter in South America, where it exists chiefly in the form of sodium iodate. It is obtained according to the following reaction:

$$2NaIO_3 + 5H_2SO_3 = I_2 + Na_2SO_4 + 4H_2SO_4 + H_2O$$

The liberated iodine is filtered off and sent to market as crude iodine.

Also obtained from kelp (the ashes of certain seaweeds), where it exists in the form of sodium iodide. The ashes are lixiviated and the solution evaporated to crystallization. The mother-liquor thus obtained is heated with manganese dioxide and sulphuric acid and the liberated iodine collected in suitable condensers.

$$2NaI + MnO_2 + 3H_2SO_4 = I_2 + 2NaHSO_4 + MnSO_4 + 2H_2O$$

Used in making pills of ferrous iodide, 5 g/n; sulphur iodide, U. S. P. VIII, 80 per cent.; syrup of ferrous iodide, 4.15 per cent. An ingredient in compound solution of iodine, 5 per cent.; tincture of iodine, 7 g/m, and ointment of iodine, 4 per cent.

Antiseptic, alterative, and caustic. Dose, 5 mg.

KAOLINUM, N. F., U. S. P. VIII—Kaolin—**Kaolin.**—*Fuller's Earth; Porcelain Clay; Bolus Alba*

Approximately $Al_2H_2Si_2O_8 + H_2O$ (258.83).

White or yellowish-white, soft powder, or in lumps; almost odorless; earthy or clay-like taste.

Insoluble in water and alcohol.

Obtained from native aluminum silicate by pulverizing and elutriating until it is free from gritty particles.

An ingredient in cataplasm of kaolin, N. F., 56.5 per cent.

Used externally as a dusting-powder, not used internally.

LITHII BROMIDUM—Lithium Bromide—**Lith. Brom.**

Contains not less than 85 per cent. of LiBr (86.86).

Very deliquescent. Preserve in air-tight containers.

White, granular salt; odorless; sharp, slightly bitter taste.

Neutral or slightly alkaline to litmus. Soluble in 0.6 mil of water; freely soluble in alcohol; soluble in ether.

Obtained by dissolving lithium carbonate in hydrobromic acid and evaporating.

$$Li_2CO_3 + 2HBr = 2LiBr + CO_2 + H_2O$$

Sedative, antilithic. Dose, 1 gm.

LITHII CARBONAS—Lithium Carbonate—**Lith. Carb.**—*Carbonate of Lithia*

Contains, when dried at 100° C., not less than 98.5 per cent. of Li_2CO_3 (73.88).

Permanent in the air. Preserve in well-closed containers.

White, light powder; odorless; alkaline taste.

Alkaline to litmus. Soluble in 78 mils of water; almost insoluble in alcohol.

Obtained by several processes from lepidolite, a mineral containing lithium silicate. One method is to fuse the powdered mineral with a mixture of barium carbonate, barium sulphate, and potassium sulphate at a very high temperature. The potassium and lithium sulphates rise to the top of the fused mass and can be extracted by lixiviation. From the sulphates thus obtained ammonia precipitates the lithium carbonate.

Antilithic, antirheumatic. Dose, 0.5 gm.

LITHII CITRAS—Lithium Citrate—Lith. Cit.—*Citrate of Lithia*

Contains not less than 98.5 per cent. of $Li_3C_6H_5O_7 + 4H_2O$ (281.92).

Deliquescent. Preserve in air-tight containers.

White powder or granular; odorless; cooling, faintly alkaline taste.

Faintly alkaline to litmus. Soluble in 1.4 mils of water; very slightly soluble in alcohol.

Obtained by dissolving lithium carbonate in a solution of citric acid and evaporating.

$$3Li_2CO_3 + 2H_3C_6H_5O_7 = LiC_6H_5O_7 + 3CO_2 + 3H_2O$$

An ingredient in effervescent salt of lithium citrate, N. F., 5 per cent.

Antilithic, antirheumatic, diuretic. Dose, 0.5 gm.

LITHII SALICYLAS, N. F., U. S. P. VIII—Lithium Salicylate—Lith. Salicyl.

Contains, when dried at 120° C., not less than 98.5 per cent. of $LiC_7H_5O_3$ (143.98).

Deliquescent in moist air. Preserve in well-closed containers, protected from heat and light.

White or grayish-white powder; odorless; sweetish taste.

Neutral or slightly acid to litmus. Very soluble in water and alcohol.

Obtained by neutralizing lithium carbonate with salicylic acid and evaporating the solution to dryness.

$$Li_2CO_3 + 2HC_7H_5O_3 = LiC_7H_5O_3 + CO_2 + H_2O$$

Antirheumatic, antiarthritic. Dose, 1 gm.

MAGNESII CARBONAS—Magnesium Carbonate—Mag. Carb. —*Light Magnesium Carbonate; Magnesia Alba; Carbonate of Magnesium*

Contains hydrated magnesium carbonate and magnesium hydroxide, approximately $(MgCO_3)_4Mg(OH)_2 + 5H_2O$ (485.70), corresponding to not less than 39.2 per cent. MgO (40.32) and containing not more than 0.8 per cent. of CaO (56.07).

Permanent in the air.

White, light, friable masses, or a white bulky powder; odorless; slight earthy taste.

Slightly alkaline to litmus. Almost insoluble in water; insoluble in alcohol.

Obtained in pure form by precipitating a rather dilute solution of magnesium sulphate with a corresponding dilute solution of sodium carbonate, boiling the mixture for a few minutes, then collecting the precipitate upon a strainer, washing, and drying it.

$$5MgSO_4 + 5Na_2CO_3 + H_2O = (MgCO_3)_4 + Mg(OH)_2 + 5Na_2SO_4 + CO_2$$

The heavy magnesium carbonate is obtained by precipitating a concentrated solution of magnesium sulphate with a concentrated solution of sodium carbonate, evaporating the mixture to dryness, digesting the residue with water for a short time, then collecting it upon a strainer, and washing and drying it.

Used as a source of magnesium in preparing solution of magnesium citrate, 15 gm.; and as a neutralizing and distributing agent in the preparation of syrup of tar, 1 g/m; syrup of tolu, 1 g/m; syrup of ginger, 1 g/m.

Antacid, laxative. Dose, 3 gm.

MAGNESII CHLORIDUM, N. F.—Magnesium Chloride—Magnes. Chlorid.

Contains not less than 95 per cent. of $MgCl_2 + 6H_2O$ (203.34).

Deliquescent in moist air. Preserve in well-closed containers.

Colorless, transparent crystals or white translucent pieces; odorless; bitter taste.

Neutral to litmus. Soluble in 0.6 mil of water; readily soluble in alcohol.

Obtained as a by-product in the manufacture of potassium chloride from carnallite ($MgKCl_3.6H_2O$); also obtained by decomposing magnesite ($MgCO_3$) with hydrochloric acid.

Mild purgative. Dose, 15 gm.

MAGNESII HYDROXIDUM

Pharmacopœial only as Magma Magnesiæ, see page 349.

MAGNESII OXIDUM—Magnesium Oxide—**Mag. Oxid.**—*Magnesia; Calcined Magnesia; Light Magnesia*

Contains, after ignition, not less than 96 per cent. of MgO (40.32) and not more than 2 per cent. of CaO. It contains not more than 10 per cent. of water.

Absorbs moisture and carbon dioxide when exposed to the air; preserve in well-closed vessels.

Very fine, white, very bulky powder; odorless and having an earthy taste.

Alkaline to litmus. Almost insoluble in water; insoluble in alcohol.

Obtained by calcining the light magnesium carbonate.

$$(MgCO_3)_4Mg(OH)_2.5H_2O + \triangle = 5MgO + 4CO_2 + 6H_2O$$

Used in preparing the aromatic fluidextract of cascara sagrada.

An ingredient in ferric hydroxide with magnesium oxide, in compound rhubarb powder, 65 per cent.; also used as a diluent and drying agent in the following powdered extracts:

Extract of belladonna leaves.
Extract of cascara sagrada.
Extract of gelsemium.
Extract of hydrastis.
Extract of nux vomica.
Extract of rhubarb.
Extract of stramonium.
Extract of viburnum prunifolium.

Antacid and laxative. Dose, 2 gm.

MAGNESII OXIDUM PONDEROSUM—Heavy Magnesium Oxide—**Mag. Oxid. Pond.**—*Heavy Magnesia; Heavy Calcined Magnesia; Oxide of Magnesium*

Contains, after ignition, not less than 96 per cent. of MgO (40.32) and not more than 2 per cent. of CaO. It contains not more than 10 per cent. of water.

Absorbs water and carbon dioxide when exposed to the air. Preserve in well-closed containers.

Very fine, dense, white powder; odorless and having an earthy taste.

Slightly alkaline to litmus. Almost insoluble in water; insoluble in alcohol.

Obtained by calcining the heavy magnesium carbonate.

$(MgCO_3)_4Mg(OH)_2.5H_2O + \triangle = 5MgO + 4CO_2 + 6H_2O$

Antacid, laxative. Dose, 2 gm.

MAGNESII SULPHAS—Magnesium Sulphate—**Mag. Sulph.**—*Epsom Salt; Bitter Salt; Sulphate of Magnesium*

Contains 48.59 to 53.45 per cent. of anhydrous magnesium sulphate, corresponding to not less than 99.5 per cent. of the crystallized salt, $MgSO_4 + 7H_2O$ (246.50).

Slowly efflorescent. Preserve in well-closed containers.

Colorless, small, prismatic needles or rhombic prisms; odorless; cooling, saline, bitter taste.

Neutral to litmus. Soluble in 1 mil of water; almost insoluble in alcohol.

Obtained, originally, by evaporating the waters of saline springs in Epsom, England. Large quantities of the salt are now prepared from magnesite ($MgCO_3$) by dissolving it in dilute sulphuric acid and crystallizing.

$$MgCO_3 + H_2SO_4 = MgSO_4 + CO_2 + H_2O$$

An ingredient in compound infusion of senna, 12 g/m.

Saline cathartic. Dose, 15 gm.

MANGANI CITRAS SOLUBILIS, N. F.—Soluble Manganese Citrate—**Mangan. Cit. Sol.**—*Manganese and Sodium Citrate*

Manganous citrate rendered soluble by the aid of sodium citrate, corresponding, when dried at 120° C., to 49 to 51 per cent. of $Mn_3(C_6H_5O_7)_2$ (542.87).

Permanent in the air. Preserve in well-closed containers.

Yellowish or pinkish-white powder, or translucent scales; odorless; slightly bitter, astringent taste.

Neutral or slightly alkaline to litmus. Soluble in 4 mils of water; nearly insoluble in alcohol.

Tonic. Dose, 200 mg.

MANGANI DIOXIDUM PRÆCIPITATUM—Precipitated Manganese Dioxide—**Mangan. Diox. Præc.**—*Peroxide of Manganese; Black Oxide of Manganese*

Chiefly manganese dioxide, MnO_2 (86.93), with small amounts of other oxides of manganese, corresponding to not less than 80 *per cent. of* MnO_2.

Permanent in the air.

A heavy, very fine, black powder without odor or taste.

Insoluble in simple solvents.

The pharmacopœial process of preparation (U. S. P. VIII) was to precipitate a solution of manganese sulphate with ammonia-water in the presence of hydrogen peroxide, collect the precipitate upon a filter, wash, and dry it at 150° C.

$$MnSO_4.4H_2O + 2NH_4OH = Mn(OH)_2 + (NH_4)_2 + 4H_2O$$
$$Mn(OH)_2 + H_2O_2 = Mn(OH)_4$$
$$Mn(OH)_4 + \text{boiling} = MnO_2 + 2H_2O$$

Tonic, alterative, emmenagogue. Dose, 250 mg.

MANGANI GLYCEROPHOSPHAS SOLUBILIS, N. F.—Soluble Manganese Glycerophosphate—**Mangan. Glycerophos. Sol.**—*Soluble Manganous Glycerinophosphate*

Contains 70 to 75 per cent. of $MnC_3H_7PO_6$ (225.03).

Preserve in well-closed containers.

Yellowish or pinkish-white powder; odorless; acid taste.

Strongly acid to litmus. Soluble in 4 mils of water; only partially dissolved by alcohol.

Obtained by neutralizing glycerophosphoric acid with manganese carbonate, filtering, precipitating the manganese glycerophosphate from the filtrate, by the addition of alcohol, and rendering it soluble by the addition of citric acid.

Tonic, reconstructive. Dose, 200 mg.

MANGANI HYPOPHOSPHIS, N. F., U. S. P. VIII—Manganese Hypophosphite—**Mangan. Hypophos.**

Contains not less than 97 per cent. of $Mn(PH_2O_2)_2 + H_2O$ (203.06).

Permanent in the air. Preserve in well-closed containers.

Pink, granular or crystalline powder; odorless; nearly tasteless.

Neutral or acid to litmus. Soluble in about 7 mils of water; insoluble in alcohol.

Obtained by double decomposition between calcium hypophosphite and manganese sulphate, filtering out the precipitated calcium sulphate, and evaporating the solution at a very low temperature and crystallizing:

$$MnSO_4 + Ca(PH_2O_2)_2 = Mn(PH_2O_2)_2 + CaSO_4$$

Also by neutralizing hypophosphorous acid with manganese carbonate and crystallizing.

$$MnCO_3 + 2HPH_2O_2 = Mn(PH_2O_2)_2 + CO_2 + H_2O$$

Tonic, reconstructive. Dose, 200 mg.

MANGANI SULPHAS, N. F., U. S. P. VIII—Manganese Sulphate—Mangan. Sulph.—*Manganous Sulphate*

Contains not more than 38 per cent. of water and 62 to 68 per cent. $MnSO_4$ (151); approximately $MnSO_4.4H_2O$ (223.06).

Efflorescent. Preserve in well-closed containers.

Pale, rose-colored, translucent, tetrahedral prisms; odorless; slightly bitter, astringent taste.

Neutral or slightly acid to litmus. Soluble in about 1 mil of water; insoluble in alcohol.

Obtained in several ways from pyrolusite (MnO_2). One method is to decompose the pyrolusite with concentrated sulphuric acid, heating to redness to decompose any iron sulphate present, lixiviating the fused mass, evaporating, and crystallizing.

$$2MnO_2 + 2H_2SO_4 + \triangle = 2MnSO_4 + O_2 + 2H_2O$$

Tonic, cathartic. Dose, 200 mg.

NITROGENII MONOXIDUM (IX)—Nitrogen Monoxide—Nitrogen. Monox.—*Nitrous Oxide; Nitrogen Sub-oxide; Laughing Gas*

Nitrogen monoxide gas, N_2O (44.02).

Colorless gas, slight characteristic odor, somewhat sweetish taste.

Soluble one volume in about 0.8 volume of water.

Obtained by heating dry ammonium nitrate in a retort and passing the evolved gas through, successively, solution of potassium hydroxide, to absorb nitrogen peroxide (NO_2); solution of ferrous sulphate, to absorb nitric oxide (NO); and through sulphuric acid to absorb water and ammonia (NH_3).

For convenience in handling and use it is compressed in strong metal cylinders.

Administered by inhalation as an anesthetic, especially in the extraction of teeth.

OXIDA—OXIDES

General Methods for Preparing Oxides.—By calcinating the respective carbonate. Magnesium Oxide (see page 143).

By decomposing the respective nitrate with heat. Red Oxide of Mercury (see page 136).

By direct union of the respective element with oxygen, usually at a high temperature. Lead Oxide (see page 150).

The pharmaceutically important oxides are:

Antimonii Oxidum, N. F., U. S. P. VIII.
Argenti Oxidum.
Arseni Trioxidum (anhydride).
Calx.
Chromii Trioxidum (anhydride).
Ferri Oxidum Saccharatum, N. F.
Hydrargyri Oxidum Flavum.
Hydrargyri Oxidum Rubrum.
Magnesii Oxidum.
Magnesii Oxidum Ponderosum.
Mangani Dioxidum Præcipitatum.
Nitrogenii Monoxidum.
Plumbi Oxidum.
Plumbi Oxidum Rubrum, N. F.
Zinci Oxidum.

OXYGENIUM (IX)—Oxygen—**Oxygen.**

Contains not less than 95 per cent. by volume of O (16).

Colorless, odorless, tasteless gas, about 10 per cent. heavier than air. Soluble one volume in about 34 volumes of water and in 3.6 volumes of alcohol.

Obtained conveniently either from water by electrolysis, or by heating a mixture of potassium chlorate and manganese dioxide (equal parts of each) in a retort and collecting the gas in a suitable container.

$$2KClO_3 + X\,MnO_2 + \triangle = 3O_2 + 2KCl + X\,MnO_2$$

The MnO_2 apparently does not enter into the reaction. For medicinal purposes it is purified by washing it first with strong sodium hydroxide solution and then with water. For convenience in handling and use it is stored in strong steel or aluminum cylinders, the gas being condensed by a pressure of about 225 pounds per square inch or to about one-fifteenth its original volume.

Oxygen is the most abundant of all elements. In the free state it constitutes about one-fifth of the volume of the air, and in the combined state not less than one-third of the weight of the earth.

Administered by inhalation in asphyxia and pneumonia.

PHOSPHORUS—Phosphorus—**Phosphor.**—*Yellow Phosphorus*

Non-metallic element, P (31.04).

It takes fire when exposed to the air, and should be kept covered with water in strong well-closed containers protected from the light.

Usually translucent, nearly colorless sticks of waxy luster, having at ordinary temperature about the consistency of beeswax; sp. gv., about 1.830 at 10° C.; m. p., about 44° C.; distinctive, disagreeable odor and taste. Caution: Should not be tasted except in very dilute solution.

Nearly insoluble in water, sparingly soluble in alcohol and in fixed oils, and in about 17 mils of chloroform.

Obtained formerly from bone-ash by first acting upon it with sulphuric acid, whereby two-thirds of the calcium was separated as calcium sulphate. The solution of calcium acid phosphate so obtained was evaporated and the residue ignited, thus converting it into calcium metaphosphate. This calcium metaphosphate was distilled with carbon and the phosphorus distillate collected under water.

$$Ca_3(PO_4)_2 + 2H_2SO_4 = CaH_4(PO_4)_2 + 2CaSO_4$$
$$CaH_4(PO_4)_2 + \triangle = Ca(PO_3)_2 + 2H_2O$$
$$3Ca(PO_3)_2 + 10\,C + \triangle = P_4 + Ca_3(PO_4)_2 + 10\,CO$$

It is now obtained extensively by heating a mixture of calcium phosphate, carbon, and clay in an electric furnace and the phosphorus distilled off in a current of inert gas.

An ingredient in pills of phosphorus, 0.06 g/n.

Nerve stimulant. Dose, 0.5 mg.

PLUMBI ACETAS—Lead Acetate—Plumb. Acet.—*Sugar of Lead*

Contains 85.31 to 89.57 per cent. of anhydrous lead acetate, corresponding to not less than 99.5 per cent. of crystallized salt, $Pb(C_2H_3O_2)_2 + 3H_2O$ (379.20).

Efflorescent; absorbs carbon dioxide on exposure to the air, becoming insoluble. Preserve in well-closed containers.

Colorless, shining, translucent, monoclinic prisms or plates, or white, heavy, crystalline masses, or granular crystals; faintly acetous odor; sweetish, astringent, afterward metallic taste.

Slightly alkaline to litmus. Soluble in 1.4 mils of water and in 38 mils of alcohol.

Obtained by dissolving lead oxide in acetic acid, evaporating, and crystallizing.

$$PbO + 2CH_3COOH = (CH_3COO)_2Pb + H_2O$$

Used in preparing solution of lead subacetate, 18 per cent.

Astringent, styptic, anhidrotic, poisonous. Dose, 60 mg.

PLUMBI CARBONAS, N. F., U. S. P. VI—Lead Carbonate—Plumb. Carb.—*White Lead; Flake White*

Contains lead carbonate and lead hydroxide, approximately $(PbCO_3)_2.Pb(OH)_2$ (775.32).

Permanent in the air.

White, heavy, opaque powder, or pulverulent mass; odorless; tasteless.

Insoluble in water and alcohol.

Obtained extensively by the "Dutch method," which consists in exposing lead to the combined action of moist air, dilute acetic acid, and carbon dioxide.

$$2Pb + 2HC_2H_3O_2 + O_2 = Pb(C_2H_3O_2)_2.Pb(OH)_2$$
$$3Pb(C_2H_3O_2)_2.Pb(OH)_2 + 2CO_2 = Pb(CO_3)_2.Pb(OH)_2 + 3Pb(C_2H_3O_2)_2 + 2H_2O$$
$$Pb(C_2H_3O_2)_2 + Pb + O + H_2O = Pb(C_2H_3O_2)_2.Pb(OH)_2$$

and thus the process repeats.

An important white pigment.

Used externally as a soothing application; also in cosmetics and face powders. Caution: It will be absorbed if there is a break in the cuticle and may produce poisoning, Not used internally.

PLUMBI IODIDUM, N. F., U. S. P. VIII—Lead Iodide—Plumb. Iod.

Contains not less than 99 per cent. of PbI_2 (460.94).

Permanent in the air. Preserve in well-closed containers, protected from light.

Bright yellow, heavy powder; odorless; tasteless.

Soluble in 1300 mils of water; very slightly soluble in alcohol.

Obtained by precipitating a solution of lead nitrate with potassium iodide, collecting, washing, and drying the precipitate.

$$Pb(NO_3)_2 + 2KI = PbI_2 + 2KNO_3$$

Alterative. Dose, about 200 mg.

PLUMBI OXIDUM—Lead Oxide—Plumb. Oxid.—*Litharge; Oxide of Lead; Yellow Oxide of Lead; Flowers of Lead; Massicot*

Contains, when freshly ignited, not less than 96 per cent. of PbO (223.10).

Absorbs moisture and carbon dioxide slowly on exposure to air; preserve in well-closed vessels.

Heavy, yellowish or reddish-yellow powder, without odor or taste.

Slightly alkaline to litmus. Almost insoluble in water; insoluble in alcohol.

Obtained as a by-product in the refining of gold and silver; also obtained by directing a current of air over molten lead.

$$Pb + O + \Delta = PbO$$

Used commercially in the glass industry in the production of *flint glass,* also in combination with glycerin to form a cement.

Used in making solution of lead subacetate and lead plaster. Not used internally.

PLUMBI OXIDUM RUBRUM, N. F.—Red Oxide of Lead—**Plumb. Oxid. Rub.**—*Red Lead; Orange Mineral; Paris Red; Minium; Sandix*

Lead orthoplumbate, Pb_2PbO_4 (685.3), usually with some unconverted PbO (223.10), corresponding to not less than 31 per cent. of lead dioxide, PbO_2 (239.10).

On exposure to air it slowly absorbs moisture and carbon dioxide.

Orange-red, heavy powder; odorless; tasteless.

Almost insoluble in water; insoluble in alcohol.

Obtained by heating litharge in a current of air.

$$3PbO + 3O + \Delta = Pb_3O_4$$

Used as a pigment.

POTASSA SULPHURATA (IX), U. S. P. VI—Sulphurated Potassa—**Pot. Sulphurat.**—*Liver of Sulphur; Sulphurated Potash*

Contains chiefly potassium polysulphides and potassium thiosulphate. The sulphides corresponding to not less than 12.8 per cent. of S (32.07).

Becomes greenish-yellow to gray through absorption of moisture, oxygen, and carbon dioxide from the air. Preserve in well-closed containers.

Liver-brown, irregular pieces; strong odor of hydrogen sulphide; bitter, acrid, alkaline taste.

Obtained by fusing together dried potassium carbonate and sulphur, pouring the melt on a clean slab to cool, and afterward breaking it into fragments.

$$3K_2CO_3 + 4S_2 + \Delta = 2K_2S_3 + K_2S_2O_3 + 3CO_2$$

Used in preparing "sulphur baths."

Parasiticide; rarely used internally.

POTASSII ACETAS—Potassium Acetate—**Pot. Acet.**—*Acetate of Potash; Diuretic Salt*

Contains, when dried at 150° C., not less than 99 per cent. of CH_3COOK (98.12).

Very deliquescent. Preserve in air-tight containers.

White powder, or crystalline masses of a satin-like luster; odorless or having a faint, acetous odor; warming saline taste.

Alkaline to litmus. Soluble in 0.5 mil of water and in 2.9 mils of alcohol.

Obtained by adding potassium carbonate or bicarbonate to acetic acid until effervescence ceases, then evaporating the solution to dryness.

$$K_2CO_3 + 2CH_3COOH = 2CH_3COOK + CO_2 + H_2O$$

Diuretic. Dose, 1 gm.

POTASSII BICARBONAS—Potassium Bicarbonate—**Pot. Bicarb.**—*Acid Carbonate of Potassium; Bicarbonate of Potash; Salæratus*

Contains, when dried to constant weight over sulphuric acid, not less than 99 per cent. of $KHCO_3$ (100.11).

Permanent in the air. Preserve in well-closed containers.

Colorless, transparent, monoclinic prisms, or a white, granular powder; odorless; saline, slightly alkaline taste.

Alkaline to litmus. Soluble in 2.8 mils of water; almost insoluble in alcohol.

Obtained by passing carbon dioxide into a solution of sodium bicarbonate, from which the bicarbonate separates out on cooling.

$$K_2CO_3 + CO_2 + H_2O = 2KHCO_3$$

Also obtained by a process analogous to the Solvay process for making sodium carbonate, substituting trimethylamine for the ammonia of the former process in order to secure the separation of the bicarbonate.

$$KCl + N(CH_3)_3 + CO_2 + H_2O = KHCO_3 + N(CH_3)_3HCl$$

Used in preparing solution of magnesium citrate, 2.5 gm.; solution of potassium arsenite, 2 per cent., and solution of potassium citrate, 8 g/m.

Diuretic, antacid. Dose, 1 gm.

POTASSII BITARTRAS—Potassium Bitartrate—**Pot. Bitart.**—*Cream of Tartar; Acid Potassium Tartrate; Crystals of Tartar*

Contains, when dried at 100° C., not less than 99.5 per cent. of $KHC_4H_4O_6$ (188.14).

Permanent in the air. Preserve in well-closed containers.

A white, somewhat gritty powder, or colorless or slightly opaque rhombic crystals; odorless; pleasant, acidulous taste.

Acid to litmus. Soluble in 155 mils of water and in 8820 mils of alcohol.

Obtained from the crude tartar or argols of the wine casks (consisting of potassium bitartrate, calcium tartrate, coloring-matter, etc.). These acid residues are partially neutralized with sodium carbonate and brought into solution in water. The solution of potassium and sodium tartrate thus obtained is allowed to crystallize. The crystals are then dissolved in water, and upon acidulating with acetic acid the potassium bitartrate is precipitated.

$$2KHC_4H_4O_6 + Na_2CO_3 = 2KNaC_4H_4O_6 + CO_2 + H_2O$$
$$KNaC_4H_4O_6 + HC_2H_3O_2 = KHC_4H_4O_6 + NaC_2H_3O_2$$

An ingredient in compound powder of jalap, 65 per cent.

Cathartic, diuretic, aperient. Dose, 2 gm.

POTASSII BROMIDUM—Potassium Bromide—Pot. Brom.—*Bromide of Potassium*

Contains, when dried at 100° C., not less than 98.5 per cent. of KBr (119.02).

Permanent in the air. Preserve in well-closed containers.

Colorless or white cubical crystals, or granular powder; odorless; strong, saline taste.

Faintly alkaline to litmus. Soluble in 1.5 mils of water and in about 250 mils of alcohol.

Obtained by double decomposition between ferrous bromide and potassium carbonate, evaporating and crystallizing the filtered solution.

$$FeBr_2 + K_2CO_3 = 2KBr + FeCO_3$$

It is also extensively prepared by adding bromine to a solution of potassium hydroxide until the liquid remains colored, then evaporating to dryness and exposing the residue, mixed with carbon, for some time at a red heat. The fused mass is lixiviated with water and the clear solution evaporated and crystallized.

$$6Br + 6KOH = 5KBr + KBrO_3 + 3H_2O$$
$$KBrO_3 + 3C + \Delta = KBr + 3CO_2$$

Sedative, hypnotic. Dose, 1 gm.

POTASSII CARBONAS—Potassium Carbonate—**Pot. Carb.**—
Salt of Tartar; Carbonate of Potassium; Sal Tartar

Contains, when dried at 180° C., not less than 99 per cent. of K_2CO_3 (138.20). Approximately $K_2CO_3.1\frac{1}{2}H_2O$, and contains not more than 15 per cent. of moisture.

Very deliquescent. Preserve in air-tight containers.

White, granular powder; odorless; strongly alkaline taste.

Strongly alkaline to litmus. Soluble in 0.9 mil of water; insoluble in alcohol.

Obtained from various sources, such as wood-ashes, native potassium chloride; grease of sheep wool (suint); molasses residues, felspar (potassium aluminum silicate), etc.

The organic sources are first ashed, the ashes lixiviated, the lixiviate is evaporated and the residue fused, and the heating continued until it acquires a bluish-white color. Thus prepared it constitutes pearl ash, or crude potassium carbonate.

Native potassium chloride is converted into the carbonate by a process analogous to the LeBlanc process for producing sodium carbonate (see page 164).

Used in preparing pills of ferrous carbonate, 8 g/n.

An ingredient in syrup of rhubarb, 1 g/m, and in aromatic syrup of rhubarb, 0.1 g/m.

Antacid. Dose, 1 gm.

POTASSII CHLORAS—Potassium Chlorate—**Pot. Chloras.**—
Chlorate of Potassium; "Potash"

Contains not less than 99 per cent. of $KClO_3$ (122.56).

Permanent in the air. Preserve in well-closed containers. Dangerous—liable to explode when heated or when triturated with organic substances (cork, tannic acid, sugar, sulphur, etc.).

Colorless, lusterous, monoclinic prisms or plates, or white granular powder; odorless; saline taste.

Neutral to litmus. Soluble in 11.5 mils of water; almost insoluble in alcohol.

Obtained by passing chlorine into milk of lime until nearly saturated, then evaporating to a sp. gv. of about 1.18; adding potassium chloride, again evaporating, and crystallizing. This process practically amounts to double decomposition between calcium chlorate and potassium chloride.

$$6Ca(OH)_2 + 6Cl_2 = 5CaCl_2 + Ca(ClO_3)_2 + 6H_2O$$

$$Ca(ClO_3)_2 + 2KCl = 2KClO_3 + CaCl_2$$

An ingredient in troches of potassium chlorate, 15 g/n.

Antiseptic. Dose, 250 mg.

POTASSII CHLORIDUM, N. F.—Potassium Chloride—Pot. Chlorid.

Contains, when dried at 100° C., not less than 99 per cent. of KCl (74.56).

Permanent in dry air. Preserve in well-closed containers.

Colorless, elongated, prismatic or cubical crystals, or white, granular powder; odorless; saline taste.

Neutral to litmus. Soluble in 2.8 mils of water; insoluble in alcohol.

Obtained from native potassium chloride (sylvite) or from native potassium-magnesium chloride (carnallite) by solution and crystallization.

It may also be obtained by crystallization from a solution of potassium chloride prepared by neutralizing hydrochloric acid with potassium carbonate.

$$K_2CO_3 + 2HCl = 2KCl + CO_2 + H_2O$$

Used as a substitute for sodium chloride in the food of gouty and rheumatic patients. Dose, 1 to 4 gm.

POTASSII CITRAS—Potassium Citrate—Pot. Cit.—*Citrate of Potash*

Contains, when dried over sulphuric acid, not less than 99 per cent. of $C_3H_4(OH)(COOK)_3 + H_2O$ (324.36).

Deliquescent in moist air. Preserve in well-closed containers.

Transparent, prismatic crystals, or white, granular powder; odorless; cooling, saline taste.

Alkaline to litmus. Soluble in 0.6 mil of water; almost insoluble in alcohol.

Obtained by neutralizing a solution of citric acid with potassium carbonate or bicarbonate, evaporating, and granulating.

$$3KHCO_3 + C_3H_4(OH)(COOH)_3 = C_3H_4(OH)(COOK)_3 + 3CO_2 + 3H_2O$$

An ingredient in effervescent potassium citrate, 20 per cent.

Diaphoretic, refrigerant. Dose, 1 gm.

POTASSII CITRAS EFFERVESCENS.—See page 386.

POTASSII ET SODII TARTRAS—Potassium and Sodium Tartrate—**Pot. et Sod. Tart.**—*Rochelle Salt; Tartrated Soda; Seignette Salt.*

Contains 73.72 to 77.39 per cent. of anhydrous potassium and sodium tartrate, corresponding to not less than 99 per cent. of the crystallized salt, $KNaC_4H_4O_6 + 4H_2O$ (282.20).

Slightly efflorescent in dry air. Preserve in well-closed containers.

White powder or colorless, transparent, rhombic prisms; odorless; cooling, saline taste.

Alkaline to litmus. Soluble in 0.9 mil of water; almost insoluble in alcohol.

Obtained by neutralizing a solution of sodium carbonate with potassium bitartrate, evaporating, and crystallizing.

$$Na_2CO_3 + 2KHC_4H_4O_6 = 2KNaC_4H_4O_6 + CO_2 + H_2O$$

An ingredient in compound effervescing powder, 750 g/n.

Purgative, refrigerant. Dose, 10 gm.

POTASSII HYDROXIDUM — Potassium Hydroxide — **Pot. Hydrox.**—*Potassium Hydrate; Caustic Potash; Potassa*

It contains not less than 85 per cent. of KOH (56.11).

Very deliquescent and should be kept in well-stoppered bottles.

White, hard, brittle pencils or fused masses, showing a crystalline fracture; odorless or having a faint odor of lye; very acrid and caustic taste.

Alkaline to litmus. Soluble in 0.9 mil of water and in 3 mils of alcohol.

Obtained from potassium carbonate by decomposing it with *milk of lime,* separating the precipitated calcium carbonate, evaporating the solution, fusing the residue, and pouring it into molds. This product is sometimes called potassa by lime.

$$K_2CO_3 + Ca(OH)_2 = 2KOH + CaCO_3$$

It is obtained quite extensively now by the electrolysis of a strong solution of potassium chloride. The metal at the cathode acts with water to form potassium hydroxide and free hydrogen, while chlorine is liberated at the anode.

Potassa by baryta is obtained by precipitating a hot solution of barium hydroxide with the necessary quantity of a concentrated solution of potassium sulphate, separating the precipitated barium sulphate, and then treating the solution as in preparing potassa by lime.

$$Ba(OH)_2 + K_2SO_4 = 2KOH + BaSO_4$$

It is also obtained by decomposing water with metallic potassium and evaporating and fusing. The reaction is very violent and great care is necessary.

$$2K + 2H_2O = 2KOH + H_2$$

Potassa by alcohol is obtained by dissolving 1 part of ordinary potassium hydroxide in 4 parts of 95 per cent. alcohol. After several days the pure alcoholic layer is drawn off from the top, evaporated, fused, etc., in the usual manner. This process removes impurities, such as chlorides, carbonates, sulphates, etc.

Used in preparing the compound solution of cresol, 8 per cent., and soft soap, 8.6 per cent.

Ingredient in the solution of potassium hydroxide, 6 per cent.

Escharotic; antacid when administered in dilute solution.

POTASSII HYPOPHOSPHIS—Potassium Hypophosphite—Pot. Hypophos.

Contains, when dried over sulphuric acid, not less than 98 per cent. KPH_2O_2 (104.16).

Very deliquescent. Preserve in well-closed containers in a dry place. Dangerous—liable to explode if triturated with nitrates, chlorates, or other oxidizing agents.

White, opaque, hexagonal plates or crystalline masses, or granular powder; odorless; pungent, saline taste.

Neutral or slightly acid to litmus. Soluble in 0.6 mil of water and in 9 mils of alcohol.

Obtained by double decomposition between calcium hypophosphite and potassium carbonate, and the clear solution evaporated and granulated.

$$Ca(PH_2O_2)_2 + K_2CO_3 = 2KPH_2O_2 + CaCO_3$$

Used in preparing diluted hydriodic acid, 1 per cent.

An ingredient in syrup of hypophosphites, 1.5 g/m.

Nerve stimulant. Dose, 0.5 gm.

POTASSII IODIDUM—Potassium Iodide—**Pot. Iod.**—*Iodide of Potassium*

Contains, when dried at 100° C., not less than 99 per cent. of KI (166.02).

Permanent in dry air, slightly deliquescent in moist air. Preserve in well-closed containers.

White, granular powder, or cubical crystals; odorless or having a slight odor of iodine; pungent, saline, afterward bitter taste.

Neutral or slightly alkaline to litmus. Soluble in 0.7 mil of water and in 22 mils of alcohol.

Prepared by adding iodine to a solution of potassium hydroxide; evaporating, mixing the residue with charcoal, heating to redness, cooling, lixiviating, evaporating the lixiviate, and crystallizing.

$$6KOH + 3I_2 = 5KI + KIO_3 + 3H_2O$$
$$5KI + KIO_3 + 3C + \Delta = 6KI + 3CO$$

Used in preparing diluted hydriodic acid, 13.5 per cent.

An ingredient in compound solution of iodine, 10 per cent.; tincture of iodine, 5 g/m, and ointment of iodine, 4 per cent.

Alterative. Dose, 300 mg.

POTASSII NITRAS—Potassium Nitrate—**Pot. Nitras.**—*Saltpetre; Nitre; Saltpeter*

Contains, when dried at 100° C., not less than 99 per cent. of KNO_3 (101.11).

Slightly hygroscopic in moist air. Preserve in well-closed containers.

White, crystalline powder or colorless, transparent, six-sided rhombic prisms; odorless; saline taste, producing a cooling sensation in the mouth.

Neutral to litmus. Soluble in 2.8 mils of water and in 620 mils of alcohol.

Obtained, usually, by double decomposition between potassium chloride and sodium nitrate. Advantage is taken of the lesser solubility of the sodium chloride in hot water to separate this by-product. It is also obtained as a by-product in other chemical manufacturing processes.

$$KCl + NaNO_3 = KNO_3 + NaCl$$

Diuretic, diaphoretic, antiseptic. Dose, 0.5 gm.

POTASSII PERMANGANAS—Potassium Permanganate—**Pot. Permang.**—*Permanganate of Potash; Chameleon; Mineral Chameleon*

Contains, when dried over sulphuric acid, not less than 99 per cent. of $KMnO_4$ (158.03).

Permanent in the air. Preserve in glass-stoppered bottles. Must not be brought into contact with readily oxidizable substances, as it is thereby reduced.

Dark purple, slender, monoclinic prisms; almost opaque by transmitted light, and of a blue, metallic luster by reflected light; odorless; in solution, sweet, afterward disagreeable, astringent taste.

Soluble in 13.5 mils of water; decomposed by alcohol.

Obtained by fusing manganese dioxide with potassium hydroxide and potassium chlorate, extracting the mass with boiling water, whereby the green potassium manganate is converted into potassium permanganate, and manganese dioxide and potassium hydroxide. The presence of potassium hydroxide prevents a full yield of permanganate, so it is converted into carbonate by passing carbon dioxide into the liquid.

$$3MnO_2 + 6KOH + KClO_3 = 3K_2MnO_4 + KCl + 3H_2O$$
$$3K_2MnO_4 + 2H_2O + \text{boiling} = 2KMnO_4 + MnO_2 + 4KOH$$

Disinfectant, deodorant, emmenagogue. Dose, 60 mg.

POTASSII SULPHAS, N. F., U. S. P. VIII—Potassium Sulphate—**Pot. Sulph.**—*Sulphate of Potash; Vitriolated Tartar*

Contains, when dried at 100° C., not less than 99 per cent. of K_2SO_4 (174.27).

Permanent in the air.

Colorless, hard, translucent, six-sided, rhombic prisms, terminated by pyramids, or a white powder; odorless; saline, somewhat bitter taste.

Neutral to litmus. Soluble in 10 mils of water; insoluble in alcohol.

Obtained as a by-product in several chemical operations.

May be made by transposing a potassium salt with sulphuric acid, evaporating, and crystallizing.

$$2KCl + H_2SO_4 = K_2SO_4 + 2HCl$$

Or

$$K_2CO_3 + H_2SO_4 = K_2SO_4 + CO_2 + H_2O$$

Cathartic, diuretic, aperient. Dose, 1 gm.

PUMEX, N. F.—Pumice

A substance of volcanic origin consisting chiefly of complex silicates of aluminum, potassium, and sodium.

Permanent in the air.

Gray, hard, rough, very light porous masses, or gray-colored, gritty powder; odorless and tasteless.

Practically insoluble in simple solvents and diluted acids.

Dry masses will usually float on water.

It is used as an abrasive and scouring agent. Small pieces are sometimes added to liquids to prevent "bumping."

SODII ACETAS—Sodium Acetate—**Sod. Acet.**

Contains 59. 97 to 62.96 per cent. of anhydrous sodium acetate, corresponding to not less than 99.5 per cent. of the crystallized salt, $CH_3COONa + 3H_2O$ (136.07).

Efflorescent in warm, dry air. Preserve in well-closed containers.

Colorless, transparent, monoclinic prisms, or granular, crystalline powder; odorless or faint acetous odor; cooling saline taste.

Neutral or slightly alkaline to litmus. Soluble in 0.8 mil of water and in 19 mils of alcohol.

Obtained by neutralizing acetic acid with sodium carbonate, and granulating.

$$Na_2CO_3 + 2CH_3COOH = 2CH_3COONa + CO_2 + H_2O$$

Diuretic. Dose, 1 gm.

SODII ARSENAS—Sodium Arsenate—**Sod. Arsen.**—*Arseniate of Soda*

Contains 58.98 to 61.92 per cent. of anhydrous sodium arsenate (di-sodium ortho-arsenate), corresponding to not less than 99 per cent. of the crystallized salt, $Na_2HAsO_4 + 7H_2O$ (312.08).

Efflorescent in dry air, somewhat deliquescent in moist air. Preserve in well-closed containers.

Poisonous. Great caution should be used in handling and tasting it.

Colorless, transparent, monoclinic prisms; odorless; mild, alkaline taste.

Neutral or slightly alkaline to litmus. Soluble in 1.5 mils of water; slightly soluble in alcohol.

Obtained by fusing a mixture of arsenic trioxide, sodium carbonate, and sodium nitrate.

The pyroarsenate thus formed is converted into arsenate by boiling in water. The solution thus formed is evaporated and the salt crystallized.

$$As_2O_3 + Na_2CO_3 + 2NaNO_3 = Na_4As_2O_7 + N_2O_3 + CO_2$$

$$Na_4As_2O_7 + H_2O = 2Na_2HAsO_4$$

Used in preparing exsiccated sodium arsenate.

Alterative, tonic, antiseptic, antiperiodic.

Dose, 5 mg.

SODII ARSENAS EXSICCATUS—Exsiccated Sodium Arsenate —**Sod. Arsen. Exsic.**

Contains, when dried at 150° C., not less than 98 per cent. of Na_2HAsO_4 (185.97).

Slightly hygroscopic. Preserve in well-closed containers.

White, amorphous powder; odorless; warm, mildly alkaline taste. Caution: Poison.

Alkaline to litmus. Soluble in 3.1 mils of water; slightly soluble in alcohol.

Prepared by exsiccating effloresced sodium arsenate at a temperature of 150° C. until it ceases to lose weight. The loss is about 59.5 per cent.

An ingredient in solution of sodium arsenate, 1 per cent.

Alterative, tonic, antiseptic, antiperiodic.

Dose, 3 mg.

SODII BENZOAS—Sodium Benzoate—**Sod. Benz.**

Contains, when dried at 110° C., not less than 99 per cent. of C_6H_5COONa (144.04).

Permanent in the air. Preserve in well-closed containers.

White, amorphous, granular, or crystalline powder; odorless; sweetish taste.

Neutral or slightly alkaline to litmus. Soluble in 1.8 mils of water and in 61 mils of alcohol.

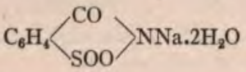
Obtained by neutralizing a solution of sodium carbonate with benzoic acid, evaporating, and crystallizing.

$$Na_2CO_3 + 2C_6H_5COOH = C_6H_5COONa + CO_2 + H_2O$$

Antirheumatic, antiseptic, antipyretic. Dose, 1 gm.

SODII BENZOSULPHINIDUM (IX)—Sodium Benzosulphinide—**Sod. Benzosulphin.**—*Sodium-Saccharin; Soluble Saccharin; Soluble Glusid; Crystallose*

The sodium salt of benzosulphinid. Formula,



$$C_6H_4\left\langle\begin{matrix}CO\\SOO\end{matrix}\right\rangle NNa.2H_2O \quad (241.14).$$

Somewhat efflorescent. Preserve in well-closed containers. It is about five hundred times sweeter than sugar.

White, crystalline powder, or colorless, rhombic prisms; odorless or faintly aromatic; intensely sweet taste.

Neutral or slightly alkaline to litmus. Soluble in 1.2 mils of water and in about 50 mils of alcohol.

Obtained by neutralizing an aqueous solution of benzosulphinide with sodium carbonate and crystallizing.

Antiseptic and sweetening agent. Dose, 200 mg.

SODII BICARBONAS—Sodium Bicarbonate—**Sod. Bicarb.**—*Bicarbonate of Soda; Soda Saleratus; Acid Sodium Carbonate; Baker's Soda; Baking Soda; Soda*

Contains, when dried over sulphuric acid, not less than 99 per cent. of $NaHCO_3$ (84.01).

Permanent in dry air, but slowly decomposed in moist air. Preserve in well-closed containers, in a cool place.

White, opaque powder; odorless; cooling, mildly alkaline taste.

Slightly alkaline to litmus. Soluble in 10 mils of water; insoluble in alcohol.

Obtained by the Solvay Process, which consists in passing carbon dioxide into a solution of sodium chloride in ammonia-water. The less soluble bicarbonate settles out.

$$NaCl + NH_4OH + CO_2 = NaHCO_3 + NH_4Cl$$

Used in preparing saccharated ferrous carbonate, 35 per cent.

An ingredient in effervescent citrated caffein, 57 per cent.; effervescent potassium citrate, 47.7 per cent.; effervescent sodium phosphate, 47.7 per cent.; compound effervescing powder, 250 g/n; troches of sodium bicarbonate, 18 g/n.

Antacid. Dose, 1 gm.

SODII BORAS—Sodium Borate—**Sod. Bor.**—*Borax; Sodium Tetraborate; Sodium Pyroborate*

Contains 52.32 to 54.92 per cent. of anhydrous sodium borate, corresponding to not less than 99 per cent. of the crystallized salt, $Na_2B_4O_7 + 10H_2O$ (382.16).

Slightly efflorescent in dry air. Preserve in well-closed containers.

Colorless, transparent, monoclinic prisms, or white powder; odorless; sweetish, alkaline taste.

Alkaline to litmus. Soluble in 15 mils of water; about 1 mil of glycerin; insoluble in alcohol.

Obtained by fusing a mixture of boric acid and anhydrous sodium carbonate, dissolving the fused mass in water, and crystallizing.

$$Na_2CO_3 + 4H_3BO_3 + \triangle = Na_2B_4O_7 + CO_2 + 6H_2O$$

Most of the American borax is obtained brom the borax lakes in the Death Valley of Nevada.

An ingredient in ointment of rose-water, 0.5 per cent.

Antiseptic. Dose, 0.75 gm.

SODII BROMIDUM—Sodium Bromide—**Sod. Brom.**

Contains, when dried at 100° C., not less than 98.5 per cent. of NaBr (102.92).

Somewhat hygroscopic. Preserve in well-closed containers.

White or colorless cubical crystals, or a white, granular powder; odorless; saline taste.

Neutral or faintly alkaline to litmus. Soluble in 1.1 mils of water and in 16 mils of alcohol.

Obtained in a manner similar to potassium bromide. Usually a solution of ferrous bromide and sodium carbonate are boiled together, the precipitate filtered out, and the clear solution evaporated and granulated.

$$FeBr_2 + Na_2CO_3 = 2NaBr + FeCO_3$$

Sedative, cerebral depressant. Dose, 1 gm.

SODII CACODYLAS (IX)—Sodium Cacodylate—**Sod. Cacodyl.**

Contains 72 to 75 per cent. of sodium dimethylarsenate, $Na(CH_3)_2AsO_2$ (160.01), and a variable amount of water of crystallization, approximately $Na(CH_3)_2AsO_2 + 3H_2O$ (214.06). (The water of crystallization varies from 1 to 3.5 molecules.)

Deliquescent. Preserve in well-closed containers.

White prisms; odorless; mild saline taste.

Neutral to litmus. Soluble in about 0.5 mil of water and in about 2.5 mils of alcohol.

Obtained by exactly neutralizing an aqueous solution of cacodylic acid with sodium carbonate, evaporating, and crystallizing.

$$2H(CH_3)_2AsO_2 + Na_2CO_3 = 2Na(CH_3)_2AsO_2 + CO_2 + H_2O$$

Alterative. (It is much less poisonous, weight for weight, than other forms of arsenic.) Dose, 60 mg.

SODII CARBONAS, U. S. P. VII—Sodium Carbonate—*Carbonate of Soda; Sal Soda; Washing Soda*

$Na_2CO_3 + 10H_2O$ (286.16).

Sodium carbonate is no longer Pharmacopœial, owing to its variable composition due to its efflorescent properties. It is replaced by the monohydrated sodium carbonate.

Colorless, monoclinic crystals, showing more or less signs of efflorescence; odorless; strongly alkaline taste.

Alkaline to litmus. When in an uneffloresced condition is soluble in about 1.6 parts of water; insoluble in alcohol.

Obtained by three processes, the Leblanc, the Solvay or Ammonia-soda, and the Cryolite.

The Leblanc Process is the older and is of considerable historic interest. It consists of decomposing sodium chloride with sulphuric acid, forming sodium sulphate (salt cake) and hychloric acid. The salt cake is next mixed with ground limestone and coal in the proper proportions and strongly heated. The product obtained in this operation is called black ash, which consists of sodium carbonate, calcium sulphite, and many intermediary products. The black ash is next lixiviated, the solution evaporated to dryness and fused with saw-dust, whereby the carbonization of the soda is completed. This fused mass is extracted with water, and the solution evaporated to crystallization.

$$2NaCl + H_2SO_4 = HaSO_4 + 2HCl$$
$$Na_2SO_4 + 4C + CaCO_3 + \triangle = Na_2CO_3 + CaS + 4CO$$

The Solvay or Ammonia-soda Process is described under the head of Sodium Bicarbonate. It produces a very pure grade of sodium carbonate. The sodium bicarbonate first produced is dried and heated and thereby converted into sodium carbonate.

$$2NaHCO_3 + \triangle = Na_2CO_3 + CO_2 + H_2O$$

The Cryolite Process consists in decomposing the mineral cryolite by heating it, short of fusion, with chalk or powdered limestone, which converts it into calcium fluoride and sodium aluminate. The sodium aluminate is separated from the insoluble calcium fluoride by extracting the mass with water. The solution of sodium aluminate thus obtained is saturated with carbon dioxide, whereby the sodium aluminate is converted into sodium carbonate and aluminum hydroxide is precipitated. The filtered solution is then evaporated and crystallized.

$$3NaF.AlF_3 + 3CaCO_3 + \triangle = Na_3AlO_3 + 3CaF_2 + 3CO_2$$
$$2Na_3AlO_3 + 3CO_2 + 3H_2O = 3Na_2CO_3 + 2Al(OH)_3$$

Used as a cleansing agent. It is invaluable in the glass-making industry and is considered as one of the world's most valuable chemicals.

SODII CARBONAS MONOHYDRATUS—Monohydrated Sodium Carbonate—**Sod. Carb. Monohyd.**

Contains not less than 99.5 per cent. of $Na_2CO_3 + H_2O$ (124.02).

Slightly hygroscopic in moist air; slightly efflorescent in warm, dry air. Preserve in well-closed containers.

White, crystalline, granular powder; odorless; strongly alkaline taste.

Strongly alkaline to litmus. Soluble in 3 mils of water; insoluble in alcohol.

Obtained by granulating a solution of sodium carbonate at a temperature above 35° C.

Used in preparing glycerin suppositories, 5 g/n; mass of ferrous carbonate, 46 per cent.; solution of chlorinated soda, 7 per cent.; spirit of nitrous ether, 0.6 gm.

Antacid. Dose, 250 mg.

SODII CHLORIDUM—Sodium Chloride—**Sod. Chlor.**—*Salt; Table Salt; Muriate of Soda; Sea Salt; Common Salt*

Contains, when dried at 110° C., not less than 99 per cent. of NaCl (58.46).

Slightly hygroscopic. Preserve in well-closed containers.

Colorless, transparent cubical crystals, or as a white crystalline powder; odorless; purely saline taste.

Neutral to litmus. Soluble in 2.8 mils of water; slightly soluble in alcohol.

Obtained from native deposits by dissolving in water and crystallizing.

An ingredient in physiological solution of sodium chloride, 0.85 g/m.

Antiseptic, stomachic, tonic, emetic.

Dose, as emetic, 15 gm.

SODII CITRAS—Sodium Citrate—**Sod. Cit.**

Contains not less than 98 per cent. of $Na_3C_6H_5O_7 + 2H_2O$ (294.07).

Slowly efflorescent in dry air. Preserve in well-closed containers.

White, granular powder; odorless; cooling, saline taste.

Slightly alkaline to litmus. Soluble in 1.3 mils of water; insoluble in alcohol.

Obtained by neutralizing a solution of citric acid with sodium carbonate or bicarbonate and granulating the product.

$$3Na_2CO_3 + 2H_3C_6H_5O_7 = 2Na_3C_6H_5O_7 + 3CO_2 + 3H_2O$$

Diuretic, antilithic, refrigerant. Dose, 1 gm.

SODII CYANIDUM (IX)—Sodium Cyanide—Sod. Cyanid.

Replaces potassium cyanide of the U. S. P. VIII.

Contains not less than 95 per cent. of NaCN (49.01).

Deliquescent. Preserve in well-closed containers; protect from light. Caution: Poison. Great care should be used in handling this salt.

White, amorphous pieces, or a white granular powder; odorless when perfectly dry, odor of hydrocyanic acid if deliquescing; should not be tasted.

Alkaline to litmus; freely soluble in water.

Obtained by heating to fusion a mixture of sodium ferrocyanide and metallic sodium. The iron settles and the sodium cyanide is drawn off, cooled, and broken into pieces.

$$Ka_4Fe(CN)_6 + 2Na + \triangle = 6NaCN + Fe$$

Source of hydrocyanic acid and extensively used as an insecticide.

Very poisonous; rarely used internally. Dose, 3 to 6 mg.

SODII GLYCEROPHOSPHAS (IX)—Sodium Glycerophosphate—Sod. Glycerophos.—*Sodium Glycerinophosphate*

Hydrated glycerophosphate, approximately $Na_2C_3H_5(OH)_2PO_4 + 5H_2O$ (306.18), containing not less than 68 per cent. of anhydrous salt, $Na_2C_3H_5(OH)_2PO_4$ (216.10).

White monoclinic plates or scales, or a white powder; odorless; saline taste.

Alkaline to litmus. Very soluble in water; nearly insoluble in alcohol.

Obtained by neutralizing an aqueous solution of glycerophosphoric acid with sodium carbonate and concentrating the solution *in vacuo*. (See Solution of Sodium Glycerophosphate, page 346.)

Nervine, tonic. Dose, 250 mg.

SODII HYDROXIDUM—Sodium Hydroxide—Sod. Hydrox.—*Sodium Hydrate; Caustic Soda; Hydrate of Soda; Soda*

Contains not less than 90 per cent. of NaOH (40.01).

Very deliquescent; should be kept in well-stoppered bottles.

Opaque white pencils or fused masses, showing a crystalline fracture; odorless; caustic taste.

Alkaline to litmus. Soluble in 0.9 mil of water; very soluble in alcohol.

Obtained by processes analogous to those used in preparing potassium hydroxide (see page 156).

Used commercially in large quantities in the manufacture of soaps.

An ingredient in solution of sodium hydroxide, 5.6 per cent.

Caustic, antacid. Dose, 30 mg., freely diluted.

SODII HYPOPHOSPHIS — Sodium Hypophosphite — Sod. Hypophos.

Contains, when dried over sulphuric acid, not less than 98 per cent. of $NaPH_2O_2 + H_2O$ (106.07).

Deliquescent; preserve in well-closed containers. Caution should be observed when dispensing it; explosions are liable to occur if it is triturated or heated with nitrates, chlorates, or other oxidizing agents.

Colorless, small, transparent, rectangular plates of a pearly luster, or a white granular powder; odorless; saline taste.

Neutral or slightly alkaline to litmus. Soluble in 1 mil of water and in about 20 mils of alcohol.

Obtained by double decomposition between sodium carbonate and calcium hypophosphite. The precipitated calcium carbonate is filtered off and the clear solution granulated.

$$Na_2CO_3 + Ca(PH_2O_2)_2 + 2NaPH_2O_2 + CaCO_3$$

An ingredient in syrup of hypophosphites, 1.5 g/m.

Tonic, reconstructive. Dose, 1 gm.

SODII INDIGOTINDISULPHONAS (IX)—Sodium Indigotindisulphonate—Sod. Indigotin.—*Indigo Carmine*

Chiefly the sodium salt, $Na_2(SO_3)_2C_{16}H_8O_2N_2$ (466.22), of indigotindisulphonic acid.

Blue powder or a dark purple paste. When compressed it acquires a coppery luster.

Sparingly soluble in water; almost insoluble in alcohol.

Obtained by heating 1 part of dry indigo with 10 parts of sulphuric acid to 100° C. for one hour; then pouring it into 990 parts of sulphuric acid, shaking, and decanting the clear liquid. The indigotindisulphonic acid thus formed is then converted into its sodium salt.

Indigo is prepared synthetically in large quantities.

Used as a coloring agent for poison tablets of corrosive mercuric chloride; also as a reagent and straining agent in microscopy.

Not used internally.

SODII IODIDUM—Sodium Iodide—Sod. Iod.

Contains not more than 7 per cent. of moisture and, when dried at 100° C., contains not less than 99 per cent. of NaI (149.92).

Deliquescent; frequently undergoes decomposition; preserve in well-closed containers.

White, crystalline powder, or colorless cubical crystals; odorless; saline taste.

Neutral or slightly alkaline to litmus. Soluble in 0.55 mil of water and in about 2 mils of alcohol.

Obtained by processes analogous to those used in preparing potassium iodide and the bromides of potassium and sodium. Generally a solution of sodium hydroxide is treated with iodine in excess, the solution evaporated to dryness, the residue fused with charcoal, the fused mass extracted with water, and the dissolved salt granulated.

$$6NaOH + 3I_2 = 5NaI + KaIO_3 + 3H_2O$$
$$5KI + NaIO_3 + 3C + \triangle = 6NaI + 3CO_2$$

Alterative, antisyphilitic. Dose, 300 mg.

SODII NITRIS—Sodium Nitrite—**Sod. Nitris**

Contains, when dried over sulphuric acid, not less than 99 per cent. of $NaNO_2$ (69.01).

Deliquescent; slowly oxidized when exposed to air; preserve in well-closed containers.

White or nearly white, opaque, fused masses or sticks; transparent, hexagonal crystals, or granular powder; odorless; mild, saline taste.

Slightly alkaline to litmus. Soluble in 1.5 mils of water; sparingly soluble in alcohol.

Obtained by fusing sodium nitrate with sheet lead; extracting the fused mass with water, evaporating, and fusing the residue.

$$NaNO_3 + Pb + \triangle = NaNO_2 + PbO$$

Used in preparing spirit of nitrous ether, 100 gm.

Antispasmodic, diuretic. Dose, 60 mg.

SODII PERBORAS (IX)—Sodium Perborate—**Sod. Perbor.**

Contains not less than 9 per cent. of available oxygen, corresponding to about 86.5 per cent. $NaBO_3 + 4H_2O$ (154.06).

Permanent in cool, dry air, decomposed with evolution of oxygen in warm or moist air. Preserve in well-closed containers.

White crystalline granules or powder; odorless; saline taste.

Alkaline to litmus. Soluble in about 40 mils of water.

Obtained by the action of hydrogen peroxide on borax in alkaline solution.

$$Na_2B_4O_7 + 4H_2O_2 + 2NaOH = 4NaBO_3 + 5H_2O$$

Antiseptic. Dose, 60 mg.

SODII PHENOLSULPHONAS—Sodium Phenolsulphonate—**Sod. Phenolsulph.**—*Sodium Sulphocarbolate*

Contains 83.64 to 87.82 per cent. of anhydrous sodium phenolsulphonate (sodium paraphenolsulphonate), corresponding to not less than 99 per cent. of crystallized salt, $NaC_6H_5O.SO_3 + 2H_2O$ (232.14).

Somewhat efflorescent in dry air. Preserve in well-closed containers.

Colorless, transparent, rhombic prisms, or crystalline granules; odorless; cooling, saline, bitter taste.

Neutral to litmus. Soluble in 4.2 mils of water and in 140 mils of alcohol.

Prepared by double decomposition between barium phenolsulphonate and sodium carbonate. The insoluble barium carbonate is separated and the solution of sodium phenolsulphonate evaporated to crystallization. The barium phenolsulphonate is prepared by allowing a mixture of phenol and sulphuric acid to remain for several days at a temperature of about 55° C. The phenolsulphonic acid thus formed is diluted with water, barium carbonate added until effervescence ceases; the insoluble barium sulphate settles, leaving the barium phenolsulphonate in solution.

$$C_6H_5OH + H_2SO_4 = C_6H_4OHSO_3H + H_2O$$
$$2C_6H_4OHSO_3H + BaCO_3 = (C_6H_4OHSO_3)_2\,Ba + CO_2 + H_2O$$
$$(C_6H_4OHSO_3)_2Ba + Na_2CO_3 = 2C_6H_4OHSO_3Na + BaCO_3$$

Antiseptic and disinfectant. Dose, 250 mg.

SODII PHOSPHAS—Sodium Phosphate—**Sod. Phos.**—*Sodium Orthophosphate; Disodium-hydrogen-phosphate*

Contains 39.25 to 44 per cent. of anhydrous sodium phosphate, corresponding to not less than 99 per cent. of crystallized salt, $Na_2HPO_4 + 12H_2O$ (358.24).

Efflorescent. Preserve in well-closed containers, in a cool place.

Colorless, large, monoclinic prisms or a granular, crystalline salt; odorless; cooling, saline taste.

Alkaline to litmus. Soluble in 2.7 mils of water; insoluble in alcohol.

Obtained by double decomposition between calcium acid phosphate and sodium carbonate, separating the precipitated calcium phosphate and evaporating the solution and crystallizing. The calcium acid-phosphate is formed by the action of sulphuric acid upon bone-ash.

$$Ca_3PO_4 + 2H_2SO_4 = CaH_4(PO_4)_2 + 2CaSO_4$$
$$3CaH_4(PO_4)_2 + 4Na_2CO_3 = 4Na_2HPO_4 + Ca_3(PO_4)_2 + 4CO_2 + 4H_2O$$

Used in preparing exsiccated sodium phosphate.

An ingredient in compound solution of sodium phosphate, N. F., 100 g/m.

Cathartic, antilithic. Dose, 4 gm.

SODII PHOSPHAS EFFERVESCENS.—See page 387.

SODII PHOSPHAS EXSICCATUS—Exsiccated Sodium Phosphate—**Sod. Phos. Exsic.**

Contains, when dried at 110° C., not less than 98 per cent. of Na_2HPO_4 (142.05).

Hygroscopic. Preserve in well-closed containers.

White, fine powder; odorless; warming, saline taste.

Alkaline to litmus. Soluble in 8.1 mils of water; insoluble in alcohol.

Prepared from sodium phosphate, which has effloresced for several days at a temperature of 25° to 30° C., by exsiccating at a temperature of 100° C. The loss in exsiccation is about 60.3 per cent.

An ingredient in effervescent sodium phosphate, 20 per cent.

Cathartic. Dose, 2 gm.

SODII SALICYLAS—Sodium Salicylate—**Sod. Salicyl.**

Contains, when dried at 100° C., not less than 99.5 per cent. of $C_6H_4(OH)COONa$ (160.04).

Preserve in well-closed containers; protect from heat and light.

White, microcrystalline powder, or scales, or a colorless to faint pinkish, amorphous powder; characteristic odor; sweet, saline taste.

Neutral or slightly acid to litmus. Soluble in 0.9 mil of water and in 9.2 mils of alcohol.

Obtained by neutralizing a solution of sodium carbonate with salicylic acid; evaporating to dryness and powdering.

$$2C_6H_4(OH)COOH + Na_2CO_3 = 2C_6H_4(OH)COONa + CO_2 + H_2O$$

Antirheumatic, antiseptic, antipyretic. Dose, 1 gm.

SODII SULPHAS—Sodium Sulphate—Sod. Sulph.—*Glauber's Salt; Sulphate of Soda; Vitriolated Soda; Horse Salts*

Contains 43.64 to 48 per cent. of anhydrous sodium sulphate, corresponding to not less than 99 per cent. of the cryslized salt, $Na_2SO_4 + 10H_2O$ (322.23).

Very efflorescent. Preserve in well-closed containers, in a cool place.

Colorless, large, transparent, monoclinic prisms, or granular crystals; odorless; bitter, saline taste.

Neutral to litmus. Soluble in about 1 mil of water; insoluble in alcohol.

Obtained as a by-product in numerous chemical operations, as in the manufacture of hydrochloric acid from sodium chloride and sulphuric acid.

$$2NaCl + H_2SO_4 = Na_2SO_4 + 2HCl$$

Cathartic. Dose, 15 gm.

SODII SULPHIS EXSICCATUS (IX)—Exsiccated Sodium Sulphite—Sod. Sulphis Exsic.

Contains not less than 90 per cent. of Na_2SO_3 (126.07).

Slowly oxidizes upon exposure to air. Preserve in well-closed containers, in a cool place.

White powder; odorless; cooling, saline, sulphurous taste.

Alkaline to litmus. Soluble in 3.2 mils of water; sparingly soluble in alcohol.

Obtained by passing sulphur dioxide gas into a solution of sodium carbonate, evaporating to dryness, and exsiccating.

$$Na_2CO_3 + SO_2 = Na_2SO_3 + CO_2$$

It is approximately double the strength of the crystallized (non-exsiccated) salt, $Na_2SO_3.7H_2O$ (252.18).

Used as a reducing agent. Also, in photography.

Antiseptic. Dose, 1 gm.

SODII THIOSULPHAS—Sodium Thiosulphate—Sod. Thiosulph.—*Sodium Hyposulphite; "Hypo"*

Contains 63.07 to 67.48 per cent. of anhydrous sodium thiosulphate, corresponding to not less than 99 per cent. of crystallized salt, $Na_2S_2O_3 + 5H_2O$ (248.22).

Permanent in air below 33° C., but efflorescent in dry air above that temperature; slightly deliquescent in moist air. Preserve in well-closed containers.

Colorless, transparent, monoclinic prisms; odorless; cooling, afterward bitter taste.

Neutral or faintly alkaline to litmus. Soluble in 0.5 mil of water; insoluble in alcohol.

Obtained by double decomposition between calcium thiosulphate (a by-product in the purification of illuminating gas, and in the manufacture of sodium carbonate by the Leblanc process) and sodium carbonate.

$$CaS_2O_3 + Na_2CO_3 = Na_2S_2O_3 + CaCO_3$$

Used in photography.

Antiseptic, parasiticide, laxative. Dose, 1 gm.

STRONTII BROMIDUM—Strontium Bromide—**Stront. Brom.**

Contains not less than 98 per cent. of $SrBr_2 + 6H_2O$ (355.57).

Deliquescent in moist air; efflorescent in dry air. Preserve in well-closed containers.

Colorless, transparent, hexagonal crystals; odorless; bitter, saline taste.

Neutral to litmus. Soluble in 0.35 mil of water; soluble in about 3 mils of alcohol.

Obtained by neutralizing hydrobromic acid with sodium carbonate, filtering the solution, concentrating, and crystallizing.

$$2HBr + SrCO_3 = SrBr_2 + CO_2 + H_2O$$

Used similarly to potassium bromide. It is less slowly absorbed into the system and hence less irritating.

Sedative. Dose, 1 gm.

STRONTII CARBONAS, N. F.—Strontium Carbonate—**Stront. Carb.**

Contains, when dried at 100° C., not less than 99 per cent. of $SrCO_3$ (147.62).

Permanent in the air.

White powder; odorless; tasteless.

Insoluble in water and alcohol.

Obtained from native strontium carbonate (strontianite) by first converting it into the chloride and crystallizing, then dissolving the purified chloride in water; precipitating with sodium carbonate, washing, and drying the precipitate.

Used as a source of other strontium salts. Used in pyrotechny and in the manufacture of iridescent glass.

The strontium ion is believed to have no therapeutic action; hence strontium salts may prove to be less irritant than the corresponding potassium salts.

STRONTII IODIDUM—Strontium Iodide—**Stront. Iod.**

Contains not less than 99 per cent. of $SrI_2 + 6H_2O$ (449.57).

Deliquescent; colored yellow by exposure to light and air. Preserve in small, amber-colored, glass-stoppered bottles, carefully protected from light.

Colorless, transparent, hexagonal plates, or a white granular powder or crystalline crusts; odorless; bitter, saline taste.

Neutral or slightly alkaline to litmus. Soluble in 0.2 mil of water; soluble in alcohol.

Obtained by neutralizing hydriodic acid with strontium carbonate, filtering the solution, concentrating, and crystallizing.

$$2HI + SrCO_3 = SrI_2 + CO_2 + H_2O$$

Used similarly to potassium iodide, particularly in asthma and rheumatism. Dose, 300 mg.

STRONTII SALICYLAS—Strontium Salicylate—**Stront. Salicyl.**

Contains, when dried over sulphuric acid, not less than 99 per cent. of $(C_6H_4(OH)COO)_2Sr + 2H_2O$ (397.74).

Preserve in well-closed containers, protected from heat and light.

White, crystalline powder; odorless; somewhat sweet, saline taste.

Soluble in 19 mils of water and in 61 mils of alcohol.

Obtained by the action of salicylic acid upon strontium carbonate, filtering, concentrating, and crystallizing.

$$2C_6H_4(OH)COOH + SrCO_3 = (C_6H_4(OH)COO)_2Sr + CO_2 + H_2O$$

Intestinal antiseptic; recommended in gout and rheumatism. Dose, 1 gm.

SULPHUR—Sulphur—S (32.07)

Represented Pharmacopœially by Sulphur Lotum, Sulphur Præcipitatum, and Sulphur Sublimation.

SULPHUR LOTUM—Washed Sulphur—**Sulphur Lot.**

When dried in a desiccator over sulphuric acid it contains not less than 99.5 per cent. of S (32.07).

Permanent in the air, but should be kept in well-stoppered bottles.

Fine yellow powder without odor or taste.

Neutral to litmus. Insoluble in water; very slightly soluble in alcohol.

Prepared by digesting sublimed sulphur with ammonia-water, straining, and washing with water until the washings become neutral. The residue is then dried and passed through a No. 30 sieve.

This washing removes traces of acids, arsenic, and such other impurities as are soluble in water and ammonia-water.

An ingredient in compound powder of glycyrrhiza, 8 per cent.

Used in preparing sulphur iodide (U. S. P. VIII), 20 per cent.

Laxative, antiseptic. Dose, 4 gm.

SULPHUR PRÆCIPITATUM—Precipitated Sulphur—**Sulphur Præc.**—*Milk of Sulphur; Lac Sulphur.* (These synonyms apply more particularly to a precipitated Sulphur which is prepared by precipitation with sulphuric acid, and which contains nearly 50 per cent. of calcium sulphate.)

When dried in a desiccator over sulphuric acid it contains not less than 99.5 per cent. of S (32.07).

Permanent in the air, but should be kept in well-stoppered bottles.

Fine, amorphous, pale-yellow powder without odor or taste.

Neutral to litmus. Insoluble in water; very slightly soluble in alcohol.

Prepared by dissolving sublimed sulphur in milk of lime, filtering, and precipitating the clear filtrate with hydrochloric acid. The precipitated sulphur is then collected, washed, and dried.

$$3CaO + 3H_2O = 3Ca(OH)_2$$
$$3Ca(OH)_2 + 6S_2 = 2CaS_5 + CaS_2O_3 + 3H_2O$$
$$2CaS_5 + 4HCl = 4S_2 + 2CaCl_2 + 2H_2S$$

Only enough hydrochloric acid is added to decompose the polysulphide, thus avoiding the precipitation of any arsenic sulphide which might be present.

Laxative, antiseptic. Dose, 4 gm.

SULPHUR SUBLIMATUM—Sublimed Sulphur—**Sulphur Sublim.**—*Flowers of Sulphur*

When dried in a desiccator over sulphuric acid it contains not less than 99.5 per cent. of S (32.07).

Permanent in the air.

Fine yellow powder; m. p., about 115° C.; slight, characteristic odor; faintly acid taste.

Acid to litmus. Insoluble in water; very slightly soluble in alcohol.

Obtained from crude sulphur by sublimation. The vapors are condensed in large, cool chambers in order to produce "powder" sublimate.

Used in preparing washed sulphur and precipitated sulphur.

An ingredient in sulphur ointment, 15 per cent.

Antiseptic externally; antiseptic and laxative internally.

Dose, 4 gm.

TALCUM PURIFICATUM—Purified Talc—**Talc. Purif.**

A purified, native, hydrous magnesium silicate, sometimes containing a small amount of aluminum silicate.

It should not be finer than a No. 100 powder.

White or grayish-white powder, which adheres to the skin, quite free from grittiness, and slippery to the touch; odorless; tasteless.

Insoluble in simple solvents and in acids.

Obtained from powdered native talc (soapstone or French chalk) by boiling it with dilute hydrochloric acid, about 20 per cent., thoroughly washing the residue with water, and drying at 110° C.

Used as a basis for "talcum powders," and as a distributing agent and filtering medium, as in the preparation of the official aromatic waters.

Dusting-powder. Used externally.

TERRA SILICEA PURIFICATA (IX)—Purified Siliceous Earth—**Ter. Sil. Purif.**—*Purified Kieselguhr; Purified Infusorial Earth; Rotten Stone; Electro Silicon; Dimatos*

A form of silica, SiO_2 (60.30), consisting of the frustules and fragments of diatoms, containing not more than 10 per cent. of moisture.

Hygroscopic. Preserve in tightly closed containers.

White or pale light gray or pale buff colored, very bulky, very fine powder; odorless; tasteless.

Insoluble in water, acids, or dilute alkaline solutions.

Obtained from native infusorial earth by boiling it with dilute hydrochloric acid, washing it with water, and igniting. Large deposits are found in Virginia, England, and in Germany.

It will retain about four times its weight of water without becoming liquid, hence the native variety is often used as a packing material for corrosive liquids. After more or less purification, it is used similarly to white Fuller's Earth in preparing absorbent and emollient dusting-powders. Used as a basis for dentifrices; filtering medium; absorptive in making dynamite; abrasive and polishing agent.

Not used internally.

THEOBROMINÆ SODIO-SALICYLAS (IX).—See page 274.

URANII NITRAS (IX)—Uranium Nitrate—**Uran. Nit.**—*Uranyl Nitrate; Uranic Nitrate*

Contains not less than 98 per cent. of $UO_2(NO_3)_2 + 6H_2O$ (502.62).

Somewhat efflorescent. Preserve in well-closed containers, protected from light. It is radio-active.

Light yellow prisms; odorless; bitter, astringent taste.

Acid to litmus. Soluble in 1.2 mils of water; freely soluble in alcohol or ether.

Obtained from pitchblende (impure uranous-uranic oxide, $UO_2.2UO_3$) by digesting the finely powdered mineral with concentrated nitric acid; removing from the solution by appropriate methods the associated compounds, such as those of Ba, Bi, Pb, Zn, Fe, etc., evaporating, and crystallizing.

Employed in diabetes and cancer. Poisonous. Use with caution.

Dose, 10 mg.

ZINCI ACETAS—Zinc Acetate—Zinc. Acet.

Contains 83.16 to 87.32 per cent. of anhydrous zinc acetate, corresponding to not less than 99.5 per cent. of the crystallized salt, $Zn(C_2H_3O_2)_2 + 2H_2O$ (219.45).

Efflorescent; loses some of its acid. Preserve in well-closed containers.

White, soft, six-sided, monoclinic plates of a pearly luster; faintly acetous odor; astringent, metallic taste.

Neutral or slightly acid to litmus. Soluble in 2.3 mils of water and in 30 mils of alcohol.

Obtained by dissolving zinc oxide in acetic acid, evaporating, and crystallizing.

$$ZnO + 2CH_3COOH = (CH_3COO)_2Zn + H_2O$$

Astringent and antiseptic. Dose, 125 mg.

ZINCI CARBONAS PRÆCIPITATUS—Precipitated Zinc Carbonate—Zinc. Carb. Præcip.—*Basic Zinc Carbonate*

Somewhat variable in composition (approximately $ZnCO_3.2Zn(OH)_2.H_2O$), corresponding to not less than 68 per cent. of ZnO (81.37).

Permanent in the air.

White, impalpable powder; odorless; tasteless.

Insoluble in water and alcohol.

Obtained from zinc sulphate and sodium carbonate by double decomposition in hot solution; washing, drying, and pulverizing.

$$3ZnSO_4.7H_2O + 3Na_2CO_3.H_2O = ZnCO_3.2Zn(OH)_2.H_2O + 3Na_2SO_4 + 2CO_2 + 21H_2O$$

Used in the preparation of the solution of zinc chloride for the removal of traces of iron, 1.2 per cent.

Mildly astringent; used chiefly in dusting-powders. Not used internally.

ZINCI CHLORIDUM—Zinc Chloride—Zinc Chlor.

Contains not less than 95 per cent. of $ZnCl_2$ (136.29).

Very deliquescent. Preserve in small, glass-stoppered bottles.

White or nearly white, granular powder, or in porcelain-like masses or molded into pencils; odorless. Caution: Intensely caustic taste.

Acid to litmus. Soluble in 0.25 mil of water and in about 1.3 mils of alcohol.

Obtained from the solution of zinc chloride by granulation or by evaporating and fusing.

Alterative, escharotic. Unofficial dose, about 10 mg.

ZINCI OXIDUM—Zinc Oxide—Zinc. Oxid.—*Flowers of Zinc; Philosopher's Wool*

Contains, when freshly ignited, not less than 99 per cent. of ZnO (81.37).

Gradually absorbs carbon dioxide from the air. Preserve in well-stoppered bottles.

White, very fine, amorphous powder without odor or taste.

Practically neutral to litmus. Insoluble in water and alcohol.

Obtained by calcining the carbonate. Commercial zinc oxide, which is largely used as a pigment, is generally obtained by roasting metallic zinc in a current of air, whereby the resulting zinc oxide sublimes. When thus prepared it should not be used in medicine.

$$ZnCO_3.2Zn(OH)_2.H_2O + \Delta = 3ZnO + CO_2 + 3H_2O$$

Used as a cosmetic.

An ingredient in the ointment of zinc oxide, 20 per cent.

Protective, astringent, antiseptic. Dose, 250 mg.

ZINCI PHENOLSULPHONAS—Zinc Phenolsulphonate—Zinc. Phenolsulph.—*Zinc Sulphocarbolate*

Contains 73.7 to 77.4 per cent. of anhydrous zinc phenolsulphonate, corresponding to not less than 99.5 per cent. of the crystallized salt, $(C_6H_4(OH)SO_3)_2Zn + 8H_2O$ (555.72).

Efflorescent; may become pink upon exposure to light and *air. Preserve* in small, well-closed containers.

Colorless, transparent, rhombic prisms, or tabular crystals or granules; odorless; astringent, metallic taste.

Acid to litmus. Soluble in 1.6 mils of water and in 1.8 mils of alcohol.

Obtained from barium phenolsulphonate and zinc sulphate by double decomposition, filtering, and crystallizing.

$$ZnSO_4 + (C_6H_4(OH)SO_3)_2Ba = (C_6H_4(OH)SO_3)_2Zn + BaSO_4$$

Antiseptic, astringent. Dose, 125 mg.

ZINCI STEARAS—Zinc Stearate—**Zinc. Stear.**

A compound of zinc with stearic acid and small but variable proportions of palmitic acid, corresponding to 13 to 15.5 per cent. of ZnO.

Permanent in the air.

White, bulky, fine powder; faint characteristic odor; tasteless.

Neutral to litmus. Insoluble in water and alcohol.

Obtained from zinc sulphate and sodium stearate by double decomposition in boiling solution. The resulting precipitate is washed, dried, and sifted.

$$ZnSO_4 + 2NaC_{18}H_{35}O_2 = Zn(C_{18}H_{35}O_2)_2 + NaSO_4$$

An ingredient in ointment of zinc stearate, N. F., 50 per cent.

Mild antiseptic and astringent. Used externally.

ZINCI SULPHAS—Zinc Sulphate—**Zinc. Sulph.**—*White Vitriol*

Contains 55.86 to 58.65 per cent. of anhydrous zinc sulphate, corresponding to not less than 99.5 per cent. of the crystallized salt, $ZnSO_4 + 7H_2O$ (287.55).

Efflorescent in dry air. Preserve in well-closed containers.

Colorless, transparent, rhombic crystals, or granular, crystalline powder; odorless; astringent, metallic taste.

Acid to litmus. Soluble in 0.6 mil of water and in 2.5 mils of glycerin. Insoluble in alcohol.

Obtained by dissolving metallic zinc in sulphuric acid, evaporating, and crystallizing.

Emetic, astringent, escharotic. Dose, as emetic, 1 gm.

ZINCI VALERAS—Zinc Valerate—**Zinc. Valer.**—*Zinc Valerianate*

Contains not less than 99 per cent. of the crystallized salt, $(C_4H_9COO)_2Zn + 2H_2O$ (303.55)

Loses valeric acid upon exposure to air, becoming partially insoluble in water. Preserve in small, well-closed containers.

White, pearly scales or powder; odor of valeric acid; astringent, metallic taste.

Acid to litmus. Soluble in 70 mils of water, usually leaving a residue of basic salt, and in 22 mils of alcohol.

Obtained from sodium valerate and zinc sulphate by double decomposition, and the sparingly soluble zinc valerate purified by recrystallization.

$$ZnSO_4 + 2C_4H_9COONa = (C_4H_9COO)_2Zn + Na_2SO_4$$

Antispasmodic, tonic. Dose, 125 mg.

ZINCUM—Zinc—**Zinc.**—*Spelter*

Contains not less than 99 per cent. of Zn (65.37).

Soon oxidizes on the surface when exposed to air (tarnishes).

Bluish-white metal, showing crystalline fracture. Occurs in sticks, rods, thin sheets, irregular granulated pieces (mossy zinc), coarse powder (shot zinc), and as a fine powder (zinc dust); sp. gv., 6.9 to 7.2; m. p., 412° to 415° C.; without odor or taste.

Insoluble in water and alcohol.

Obtained chiefly from zinc sulphide (blende). The ore is roasted to remove excess of sulphur, then mixed with charcoal, and strongly heated in graphite retorts. The metallic zinc sublimes.

$$2ZnO + C + \Delta = 2Zn + CO_2$$

Used in preparing solution of zinc chloride and, with an acid, in preparing hydrgen, thus:

$$\underset{\text{Zinc.}}{Zn} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Hydrogen.}}{H_2} + \underset{\text{Zinc sulphate.}}{ZnSO_4}$$

GENERAL METHODS FOR PREPARING SALTS

(Synopsis)

Acetates.—By double decomposition between the acid and the *oxide,* hydroxide, carbonate, or bicarbonate of the metal.

Arsenates.—By double decomposition through fusion of arsenic trioxide with sodium nitrate and carbonate.

Arsenites.—By double decomposition through boiling arsenic trioxide with a solution of alkaline carbonate or bicarbonate.

Bromides.—Simple reaction.

By decomposition between bromine and a hydroxide of the metal.

By double decomposition between hydrobromic acid, or an appropriate bromide, and a carbonate of the metal.

Carbonates.—By double decomposition, sublimation, precipitation, and *purifying a natural product.*

Bicarbonates.—By passing CO_2 gas into a solution of the carbonate.

Chlorates.—By single decomposition between the hydroxide of the metal and chlorine.

By double decomposition between calcium chlorate and a soluble carbonate or potassium chlorate and a soluble bitartrate.

Chlorides.—Purification of a natural product.

By single decomposition between the metal and hydrochloric acid.

By double decomposition between hydrochloric acid and a carbonate of the metal, and by sublimation.

Chromates.—By double decomposition through fusion.

Dichromates.—By double decomposition between a chromate and sulphuric acid.

Citrates.—Similar to acetates and special methods.

Cyanides.—By double decomposition through fusion.

Ferrocyanides.—By double decomposition through fusion.

Gallates.—Double decomposition between gallic acid and a soluble salt of the metal.

Hypochlorites.—Simple decomposition between calcium hydroxide and chlorine.

Hypophosphites.—By simple decomposition between calcium hydroxide and phosphorus.

By double decomposition between calcium hypophosphite and a soluble carbonate, or appropriate salt of the metal.

Iodides.—Same as for bromides, and by double decomposition between a soluble iodide and appropriate salt of the metal.

Lactates.—Same as Acetates.

Nitrates.—By purification of natural nitrates.

By decomposition between the metal or oxide of the metal and nitric acid.

Nitrites.—Reduction of the nitrate by fusion with carbon.

Oleates.—By double decomposition between the acid and the base.

By double decomposition between a soluble oleate and appropriate salt of the metal.

Oxalates.—Double decomposition between a soluble oxalate and appropriate salt of the base.

Permanganates.—Double decomposition through fusion.

Phenolsulphonates.—Double decomposition between barium phenolsulphonate and appropriate salt of the metal.

Phosphates.—By purification of natural product.

By double decomposition between a phosphate and an appropriate salt of the metal.

Pyrophosphates.—By heating an acid phosphate.

Salicylates.—Same as for acetates.

Silicates.—Purification of natural products.

Stearates.—Double decomposition between sodium stearate and salt of the metal.

Sulphates.—By purification of by-products.

By simple decomposition between the metal and sulphuric acid.

By double decomposition between an oxide, hydroxide, carbonate, or bicarbonate of the metal and sulphuric acid.

Sulphides.—By reduction of sulphates by fusion with charcoal.

Sulphites.—By double decomposition between a carbonate of the metal and sulphurous acid.

Tartrates.—By purifying a by-product.

By double decomposition between an acid tartrate and an oxide or carbonate of the metal.

Tannates.—Similar to gallates.

Thiosulphates.—By double decomposition between calcium thiosulphate and appropriate salt of the metal.

Valerates.—By neutralizing a base with valerianic acid.

By double decomposition between sodium valerate and an appropriate salt of the metal.

Table of Medicinally Important Elements and Their Representative U. S. P. and N. F. Compounds

Note.—Key for using the table of elements. The following order is observed: 1st, The name of the element; 2d, the symbol; 3d, atomic weight; 4th, valence; 5th, predominant therapeutic action of the ion; 6th, compounds.

Aluminum.—Al, 27.1, 3+, astringent.

Alumen.
Alumen Exsiccatum.
Alumini Chloridum, N. F.
Alumini Hydroxidum.
Alumini Sulphas, N. F.

"*Ammonium.*"—NH_4, 18.04, 1+, stimulant.

Ammonii Acetas, only in solution, see page 336.
Ammonii Benzoas.
Ammonii Bromidum.
Ammonii Carbonas.
Ammonii Chloridum.
Ammonii Citras, only in N. F. solution.
Ammonii Hypophosphis, N. F.
Ammonii Iodidum.
Ammonii Phosphas, N. F.
Ammonii Salicylas.
Ammonii Valeras.

Antimonium.—Sb, 120.2, 3+, emetic, laxative, poison.

Antimonii et Potassii Tartras.
Antimonii Oxidum, N. F.
Antimonium Sulphuratum, N. F.

Argentum.—Ag, 107.88, 1+, alterative, antiseptic.

Argenti Nitras.
Argenti Nitras Fusus.
Argenti Oxidum.

Arsenum.—As, 74.96, 3+, alterative, poison.

Arseni Iodidum.
Arseni Trioxidum.

ARSENATES.—See page 189, 5+, alterative, poison.
ARSENITES.—See page 189, 3+, alterative, poison.

Aurum.—Au, 197.2, 3+, alterative.

Auri et Sodii Chloridum.

Bismuthum.—Bi, 208.0, 3+, astringent, antiseptic.

Bismuthi Betanaphtholas (IX).
Bismuthi et Ammonii Citras.
Bismuthi Subcarbonas.
Bismuthi Subgallas.
Bismuthi Subnitras.
Bismuthi Subsalicylas.

Boron.—B, 11.

Borates only, see page 190, 3+, antiseptic.

Bromum, N. F.—Br, 79.92, free, escharotic, disinfectant.
Bromides only, see page 190, 1^-, sedative.

Calcium.—Ca, 40.07, 2^+, tonic, reconstructive.
Calcii Bromidum.
Calcii Carbonas Præcipitatus.
Calcii Chloridum.
Calcii Glycerophosphas (IX).
Calcii Hypophosphis.
Calcii Lactas (IX).
Calcii Lactophosphas, N. F.
Calcii Phosphas Præcipitatus, N. F.
Calcii Sulphidum Crudum.
Calx.
Calx Chlorinata.
Creta Præparata.

Carboneum.—C, 12.00, free, absorptive.
Carbo Animalis, U. S. P. VIII.
Valence in compounds, 4.
Carbo Ligni.
Carbo Animalis Purificatus, U. S. P. VIII.

Cerium.—Ce, 140.25, 3^+.
Cerii Oxalas.

Chlorum.—Cl, 35.46, free, disinfectant.
Represented by liquor chlori compositus, U. S. P. VIII, and by hypochlorites, see page 191.
CHLORATES.—See page 190, 5^+, antiseptic.
CHLORIDES.—See page 190, 1^+, antiseptic.

Chromium.—Cr, 52.0, 6^+, escharotic.
Chromii Trioxidum.

Cuprum.—Cu, 63.57, 2^+, antiseptic, emetic.
Cupri Sulphas.

Ferrum.—Fe, 55.84, free, tonic.
Ferrum.
Ferrum Reductum.

FERROUS.—2^+, tonic, astringent.
Ferri Carbonas Saccharatus.
Ferri Iodidum, in syrup, see page 408.
Ferri Lactas, N. F.
Ferri Sulphas.
Ferri Sulphas Exsiccatus.
Ferri Sulphas Granulatus.

FERRIC.—3^+, tonic, astringent.
Ferri Chloridum.
Ferri et Ammonii Citras.
Ferri et Quininæ Citras.
Ferri Glycerophosphas, N. F.
Ferri Hydroxidum, U. S. P. *VIII.*
Ferri Hydroxidum cum Magnesii Oxido.
Ferri Hypophosphis, N. F.
Ferri Phosphas.
Ferri Pyrophosphas, N. F.

Hydrargyrum.—Hg, 200.6, free, alterative, laxative.

Internally, Hydrargyrum cum Creta.

Externally, only in preparations, see page 137.

MERCUROUS.—1+, laxative, alterative.

Hydrargyri Chloridum Mite.

Hydrargyri Iodidum Flavum.

MERCURIC.—2+, alterative, poison.

Hydrargyri Chloridum Corrosivum.

Hydrargyri Iodidum Rubrum.

Hydrargyri Oxidum Flavum.

Hydrargyri Oxidum Rubrum.

Hydrargyri Salicylas (IX).

Hydrargyrum Ammoniatum.

Hydrogenium.—H, 1.008, 1+.

In compounds.

Iodum.—I, 126.92, free, antiseptic, caustic.

IODIDES.—See page 191, 1^-, alterative.

Lithium.—Li, 6.94, 1+, antilithic.

Lithii Bromidum.

Lithii Carbonas.

Lithii Citras.

Lithii Salicylas, N. F.

Magnesium.—Mg, 24.32, 2+, laxative.

Magnesii Carbonas.

Magnesii Chloridum, N. F.

Magnesii Citras, only in solution, see page 342.

Magnesii Oxidum.

Magnesii Oxidum Ponderosum.

Magnesii Sulphas.

Manganum.—Mn, 54.93, alterative, tonic.

MANGANOUS.—2+.

Mangani Citras Solubilis, N. F.

Mangani Glycerophosphas Solubilis, N. F.

Mangani Hypophosphis, N. F.

Mangani Sulphas, N. F.

MANGANIC.—3+, alterative, tonic.

Mangani Dioxidum Præcipitatum, 4+.

PERMANGANATES.—See page 192, 7+.

Nitrogenium.—N, 14.01, 3^-, 5+.

Nitrogenii Monoxidum (IX), anesthetic.

Oxygenium (IX).—O, 16.0, free, disinfectant.

Valence in compounds, 2^-.

Phosphorus.—P, 31.04, free, nervine, poison.

See *Pills*, page 376.

Hypophosphites.—See page 191, 3+, nervine.

Phosphates.—See page 192, 5+, laxative.

Plumbum.—Pb, 207.1, 2+, poison, astringent.

- Plumbi Acetas.
- Plumbi Carbonas, N. F.
- Plumbi Iodidum, N. F.
- Plumbi Oxidum.
- Plumbi Oxidum Rubrum, N. F.
- Plumbi Subacetas, only in solution, see page 343.

Potassium.—K, 39.1, 1+.

- Potassa Sulphurata (IX).
- Potassii Acetas.
- Potassii Bicarbonas.
- Potassii Bitartras.
- Potassii Bromidum.
- Potassii Carbonas.
- Potassii Chloras.
- Potassii Chloridum, N. F.
- Potassii Citras.
- Potassii Citras Effervescens.
- Potassii et Sodii Tartras.
- Potassii Hydroxidum.
- Potassii Hypophosphis.
- Potassii Iodidum.
- Potassii Nitras.
- Potassii Permanganas.
- Potassii Sulphas, N. F.

Silicon.—Si, 28.3, 3+.

- Kaolinum, N. F.
- Pumex, N. F.
- Talcum, U. S. P. VIII.
- Talcum Purificatum.
- Terra Silicea Purificata (IX).

Sodium.—Na, 23.0, 1+.

- Sodii Acetas.
- Sodii Arsenas.
- Sodii Arsenas Exsiccatus.
- Sodii Benzoas.
- Sodii Benzosulphinidum (IX).
- Sodii Bicarbonas.
- Sodii Boras.
- Sodii Bromidum.
- Sodii Cacodylas (IX).
- Sodii Carbonas Monohydratus.
- Sodii Chloridum.
- Sodii Citras.
- Sodii Cyanidum (IX).
- Sodii Glycerophosphas (IX).
- Sodii Hydroxidum.
- Sodii Hypophosphis.
- Sodii Indigotindisulphonas (IX).
- Sodii Iodidum.
- Sodii Nitris.
- Sodii Perboras (IX).
- Sodii Phenolsulphonas.
- Sodii Phosphas.
- Sodii Phosphas Effervescens.
- Sodii Phosphas Exsiccatus.
- Sodii Salicylas.
- Sodii Sulphas.
- Sodii Sulphis Exsiccatus (IX).
- Sodii Thiosulphas.

Strontium.—Sr, 87.63, 2+, poison.

- Strontii Bromidum.
- Strontii Carbonas, N. F.
- Strontii Iodidum.
- Strontii Salicylas.

Sulphur.—S, 32.07, free, laxative.

- Sulphur Lotum.
- Sulphur Præcipitatum.
- Sulphur Sublimatum.

SULPHATES.—See page 193, 6+, laxative.

SULPHIDES.—See page 193, 2^-, antiferment.

SULPHITES.—See page 193, 4+, antiseptic, germicide.

THIOSULPHATES.—See page 193, 2+, mild antiferment and germicide.

Uranium.—U, 238.5, 6+, protoplasmic poison.

- Uranii Nitras (IX).

Zincum.—Zn, 65.37, free.

Compounds, 2+, astringent, poisonous, emetic.

- Calamina Præparata, N. F.
- Zinci Acetas.
- Zinci Carbonas Præcipitatus.
- Zinci Chloridum.
- Zinci Oxidum.
- Zinci Phenolsulphonas.
- Zinci Stearas.
- Zinci Sulphas.
- Zinci Valeras.

List of U. S. P. and N. F. Salts Classified According to Acid Radicals, the Predominant Therapeutic Action of Each Anion Being Indicated.

Acetates.—Diuretic.

- Plumbi Acetas.
- Plumbi Subacetas, only in solution, see page 343.
- Potassii Acetas.
- Sodii Acetas.
- Zinci Acetas.

Arsenates.—Alterative. Poison.

- Sodii Arsenas.
- Sodii Arsenas Exsiccatus.

Arsenites.—Alterative. Poison.

- Potassii Arsenis, only in solution, see page 344.

Benzoates.—Antiseptic.

- Ammonii Benzoas.
- Lithii Benzoas, U. S. P. VIII.
- Sodii Benzoas.

Benzosulphinides.—Antiseptic.
Sodii Benzosulphinidum (IX).

Betanaphtholates.—Antiseptic.
Bismuthi Betanaphtholas (IX).

Borates.—Antiseptic.
Sodii Boras.
Sodii Perboras (IX).

Bromides.—Hypnotic.
Ammonii Bromidum.
Calcii Bromidum.
Lithii Bromidum.
Potassii Bromidum.
Sodii Bromidum.
Strontii Bromidum.
Zinci Bromidum, U. S. P. VIII.

Cacodylates.—Alterative.
Sodii Cacodylas (IX).

Carbonates.—Antacid.
Ammonii Carbonas.
Bismuthi Subcarbonas.
Calcii Carbonas Præcipitatus.
Creta Præparata.
Ferri Carbonas Saccharatus.
Lithii Carbonas.
Magnesii Carbonas.
Plumbi Carbonas N. F.
Potassii Bicarbonas.
Potassii Carbonas.
Sodii Bicarbonas.
Sodii Carbonas Monohydratus.
Strontii Carbonas, N. F.
Zinci Carbonas Præcipitatus.

Chlorates.—Antiseptic.
Potassii Chloras.
Sodii Chloras, U. S. P. VIII.

Chlorides.—Antiseptic.
Alumini Chloridum, N. F.
Ammonii Chloridum.
Auri et Sodii Chloridum.
Calcii Chloridum.
Ferri Chloridum.
Hydrargyri Chloridum Corrosivum.
Hydrargyri Chloridum Mite.
Hydrargyrum Ammoniatum.
Magnesii Chloridum, N. F.
Potassii Chloridum, N. F.
Sodii Chloridum.
Zinci Chloridum.

Chromates.—Escharotic.
Potassii Dichromas, U. S. P. VIII.

Citrates.—Diuretic.

- Bismuthi Citras, U. S. P. VIII.
- Bismuthi et Ammonii Citras.
- Ferri Citras, U. S. P. VIII.
- Ferri et Ammonii Citras.
- Ferri et Quininæ Citras, U. S. P. VIII.
- Ferri et Quininæ Citras (IX). Same as Ferri et Quininæ Citras Solubilis, U. S. P. VIII.
- Ferri et Strychninæ Citras, U. S. P. VIII.
- Lithii Citras.
- Mangani Citras Solubilis, N. F.
- Potassii Citras.
- Sodii Citras.

Cyanides.—Poisonous.

- Argenti Cyanidum, U. S. P. VIII.
- Potassii Cyanidum, U. S. P. VIII.
- Sodii Cyanidum (IX).

Ferrocyanides:

- Potassii Ferrocyanidum, U. S. P. VIII.

Gallates.—Astringent.

- Bismuthi Subgallas.

Glycerophosphates.—Tonic. Reconstructive.

- Calcii Glycerophosphas (IX).
- Ferri Glycerophosphas, N. F.
- Mangani Glycerophosphas Solubilis, N. F.
- Sodii Glycerophosphas (IX).

Hypochlorites.—Disinfectant.

- Calx Chlorinata.

Hypophosphites.—Tonic. Reconstructive.

- Ammonii Hypophosphis, N. F.
- Calcii Hypophosphis.
- Ferri Hypophosphis, N. F.
- Mangani Hypophosphis, N. F.
- Potassii Hypophosphis.
- Sodii Hypophosphis.

Indigotindisulphonates.—Color agent.

- Sodii Indigotindisulphonas (IX).

Iodides.—Alterative.

- Ammonii Iodidum.
- Arseni Iodidum.
- Hydrargyri Iodidum Flavum.
- Hydrargyri Iodidum Rubrum.

Iodides.—Alterative.
Plumbi Iodidum, N. F.
Potassii Iodidum.
Sodii Iodidum.
Strontii Iodidum.
Sulphuris Iodidum, N. F.
Zinci Iodidum, U. S. P. VIII.
Lactates.—Refrigerant.
Calcii Lactas (IX).
Ferri Lactas, N. F.
Lactophosphates.—Tonic.
Calcii Lactophosphas, N. F.
Nitrates.—Solvent. Antiseptic.
Argenti Nitras.
Argenti Nitras Fusus.
Argenti Nitras Mitigatus, U. S. P. VIII.
Bismuthi Subnitras.
Plumbi Nitras, U. S. P. VIII.
Potassii Nitras.
Sodii Nitras, U. S. P. VIII.
Uranii Nitras (IX).
Nitrites.—Diuretic.
Sodii Nitris.
Oleates.—Laxative.
Sapo.
See Oleates, page 368.
Sapo Mollis.
Oxalates.—Sedative. Poison.
Cerii Oxalas.
Perborates.—Antiseptic.
Sodii Perboras (IX).
Permanganates.—Antiseptic. Cauterant.
Potassii Permanganas.
Phenolsulphonates.—Antiseptic.
Sodii Phenolsulphonas.
Zinci Phenolsulphonas.
Phosphates.—Laxative (in saline combinations).
Ammonii Phosphas, N. F.
Calcii Phosphas Præcipitatus, N. F.
Ferri Phosphas (IX). Same as Ferri Phosphas Solubilis, U. S. P. VIII.
Sodii Phosphas.
Sodii Phosphas Exsiccatus.
Pyrophosphates.—Tonic.
Ferri Pyrophosphas, N. F. Same as Ferri Pyrophosphas Solubilis, U. S. P. VIII.
Sodii Pyrophosphas.

Salicylates.—Antiseptic.
Ammonii Salicylas.
Bismuthi Subsalicylas.
Hydrargyri Salicylas (IX).
Lithii Salicylas, N. F.
Sodii Salicylas.
Strontii Salicylas.

Silicates.—
Kaolinum, N. F.
Pumex, N. F.
Talcum, U. S. P. VIII.
Talcum Purificatum.
Terra Silicea Purificata (IX).

Stearates.—
Zinci Stearas.

Sulphates.—Laxative (in saline combination).
Alumen.
Alumen Exsiccatum.
Alumini Sulphas, N. F.
Calcii Sulphas Exsiccatus, U. S. P. VIII.
Cupri Sulphas.
Ferri et Ammonii Sulphas, U. S. P. VIII.
Ferri Sulphas.
Ferri Sulphas Exsiccatus.
Ferri Sulphas Granulatus.
Magnesii Sulphas.
Mangani Sulphas, N. F.
Potassii Sulphas, N. F.
Sodii Sulphas.
Zinci Sulphas.

Sulphides.—Antiferment.
Antimonium Sulphuratum, N. F.
Calcii Sulphidum Crudum.
Potassa Sulphurata (IX).

Sulphites.—Antiseptic.
Sodii Bisulphis, U. S. P. VIII.
Sodii Sulphis, U. S. P. VIII.
Sodii Sulphis Exsiccatus (IX).

Tannates.—Astringent.
None.

Tartrates.—Refrigerant, Laxative (in saline combination).
Antimonii et Potassii Tartras.
Ferri et Ammonii Tartras, U. S. P. VIII.
Ferri et Potassii Tartras, U. S. P. VIII.
Potassii Bitartras.
Potassii et Sodii Tartras.

Thiosulphates.—Antiseptic.
Sodii Thiosulphas.

Valerates (Valerianates).—Sedative.
Ammonii Valeras.
Zinci Valeras.

CHAPTER III

ORGANIC CHEMICALS

UNDER this heading will be considered the organic acids, bases (alkaloids), neutral and bitter principles, glucosides, and other chemicals which are completely volatilized at a high temperature by combining with oxygen. These chemicals are, for the most part, composed of the elements carbon and hydrogen, or carbon, hydrogen, and oxygen. In some cases nitrogen, phosphorus, sulphur, arsenic, the halogens, and occasionally other elements are present.

GENERAL DEFINITIONS

Alcohols.—A group of chemicals characterized by the presence of the hydroxyl radical (—OH) and considered as derived from hydrocarbons by the replacement of one or more hydrogen atoms with a corresponding number of hydroxyl radicals. They are classified as follows:

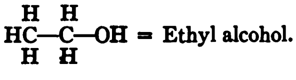
Aromatic Alcohol.—An alcohol in which hydrogen of the fatty hydrocarbon radical is replaced by a benzene derivative. For example, when the radical benzyl (C_6H_5) replaces one of the hydrogen atoms in methyl alcohol (CH_3OH) benzyl alcohol ($C_6H_5CH_2OH$) results.

Diatomic Alcohols.—Alcohols having two hydroxyl groups; also termed *Glycols.*

Monatomic Alcohols.—Alcohols having only one hydroxyl radical.

Polyatomic Alcohol.—An alcohol having more than one hydroxyl radical.

Primary Alcohol.—One in which the hydroxyl radical is linked to a carbon atom which is joined to but one other carbon atom, thus,



$$\begin{array}{c}\mathrm{H}\ \ \mathrm{H}\\ \mathrm{HC{-}C{-}OH}\\ \mathrm{H}\ \ \mathrm{H}\end{array} = \text{Ethyl alcohol.}$$

Lactophosphate.	Nitrate.	Nitrite.
	Sub I.	

Alkaloids.—L. *alkali*, alkali + Gr. *oid*, resembling.

Definition.—Nitrogenous carbon compounds capable of neutralizing acids (Prescott).

Alkaloids may be classified as follows:

Natural Alkaloids.—Those found in nature, as the vegetable and animal alkaloids.

Synthetic Alkaloids or Artificial Alkaloids.—Those prepared in the chemical laboratory, specifically those not found in nature. (See page 197.)

Vegetable Alkaloids.—Those found in various plants.

These are of special interest to the pharmacist and physician since, as a class, they are active therapeutic agents which represent in a high degree the therapeutic properties of the plant or plants from which they are derived.

Animal Alkaloids.—Those found in animal tissues. If formed in the living tissues they are called leukomaines; if formed in dead tissues they are called ptomaines.

Solid alkaloids (grouped according to their physical property) are generally composed of the elements carbon, hydrogen, oxygen, and nitrogen.

Liquid alkaloids are generally volatile and are usually composed of the elements carbon, hydrogen, and nitrogen. Examples: Coniine, nicotine.

The alkaloids are, with few exceptions, soluble in alcohol, chloroform, and ether, less so in petroleum benzin, and, as a rule, only sparingly soluble in water. They have, with few exceptions, an intensely bitter taste. They should be kept protected from light and air.

The official alkaloids and their salts, with the exception of veratrine and pelletierine tannate, which are amorphous, are colorless or nearly colorless crystalline substances. For medicinal purposes the alkaloidal salts, on account of their permanency and greater solubility in aqueous liquids, are usually to be preferred to the free alkaloid.

The alkaloids are precipitated from solutions not too dilute, by alkaline hydrates and carbonates; borax; iodides and bromides, particularly when combined with mercuric chloride; tannic acid; and many by acetates, gallates, oxalates, salicylates, *and tartrates.* The precipitation may often be prevented by

S

Alum		
Amm		
Anti		
[illegible]		

the addition of alcohol or glycerin, or both, but care should be exercised, and under no condition is it advisable to take any chances where the alkaloid concerned is one of the potent ones.

The alkaloids and their salts, owing to their bitter taste, are best administered in capsules or in pills, though they are frequently administered in tablets or in solution. In the latter case if the taste is very bitter the bitterness can be masked to quite an extent by the use of adjuvant elixir, fluidextract of eriodictyon, or chocolate syrup.

Atropine, cocaine, and veratrine, in certain instances, are administered epidermically in the form of oleate. (See page 368.) Where prompt action is desired, salts of the alkaloids may be administered hypodermically: apomorphine, atropine, hyoscine, morphine, scopolamine, sparteine, and strychnine are especially suitable for this form of administration. Homatropine, cocaine, and veratrine are desired principally for their local action.

There are 31 different alkaloids officinal, either free or combined with acids in the form of salts.

LIST OF U. S. P. AND N. F. ALKALOIDS AND ALKALOIDAL SALTS

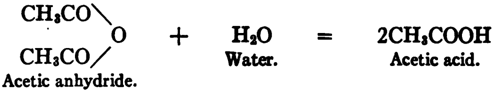
	Name.	Source.
1.	Aconitina	Aconite.
2.	Æthylmorphinæ Hydrochloridum (IX)	Synthetic from morphine.
3.	Antipyrina	Synthetic.
4.	Apomorphinæ Hydrochloridum	Synthetic from morphine.
5.	Atropina Atropinæ Sulphas.	Belladonna and other solanaceous plants.
6.	Beta-eucainæ Hydrochloridum (IX)	Synthetic from piperidine.
7.	Caffeina Caffeina Citrata Effervescens. Caffeinæ Sodio-benzoas (IX).	Tea and coffee.
8.	Cinchonidinæ Sulphas	Bark of various species of cinchona, principally red cinchona.
9.	Cinchoninæ Sulphas	Bark of various species of cinchona, principally red cinchona.
10.	Cocaina Cocainæ Hydrochloridum.	Coca and its varieties.
11.	Codeina Codeinæ Phosphas. Codeinæ Sulphas.	Opium and synthetically from morphine.
12.	Colchicina	Colchicum, seed and corm.
13.	Cotarninæ Hydrochloridum (IX)	Synthetically from narcotine.

	Name.	Source.
14.	Diacetylmorphina (IX) Diacetylmorphinæ Hydrochloridum (IX).	Synthetically from morphine.
15.	Emetinæ Hydrochloridum (IX)	Ipecac.
16.	Homatropinæ Hydrobromidum	Synthetic.
17.	Hydrastina Hydrastinæ Hydrochloridum (IX).	Hydrastis.
18.	Hydrastininæ Hydrochloridum	Synthetically from hydrastine.
19.	Hyoscyaminæ Hydrobromidum	Hyoscyamus and other solanaceous plants.
20.	Morphina Morphinæ Hydrochloridum. Morphinæ Sulphas.	Opium.
21.	Pelletierinæ Tannas	Pomegranate bark.
22.	Physostigminæ Salicylas	Physostigma.
23.	Pilocarpinæ Hydrochloridum Pilocarpinæ Nitras.	Pilocarpus.
24.	Quinidina, N. F.	Barks of various species of cinchona.
25.	Quinina Quininæ Bisulphas. Quininæ Dihydrochloridum (IX). Quininæ et Ureæ Hydrochloridum (IX). Quininæ Glycerophosphas, N. F. Quininæ Hydrobromidum. Quininæ Hydrochloridum. Quininæ Hypophosphis, N. F. Quininæ Salicylas. Quininæ Sulphas. Quininæ Tannas (IX). Quininæ Valeras, N. F.	Barks of various species of cinchona.
26.	Scopolaminæ Hydrobromidum	Scopola, and the seed of hyoscyamus and stramonium.
27.	Sparteinæ Sulphas	Scoparius.
28.	Strychnina Strychninæ Glycerophosphas, N. F. Strychninæ Nitras. Strychninæ Sulphas. Strychninæ Valeras, N. F.	Nux vomica and various species of strychnos.
29.	Theobrominæ Sodio-salicylas (IX)	Theobroma.
30.	Theophyllina (IX)	Tea and synthetically.
31.	Veratrina	Sabadilla.

Alkyl.—A term applied to radicals of the methane series: CH_3—methyl, C_2H_5—ethyl, etc.

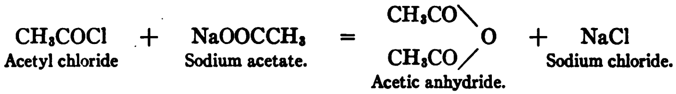
Anhydride.—Meaning without water. One of a class of chemical compounds which unite with water to form acids. These are sometimes called "acid anhydrides."

$$\underset{\text{Sulphuric anhydride.}}{SO_3} + \underset{\text{Water.}}{H_2O} = \underset{\text{Sulphuric acid.}}{H_2SO_4}$$



$$\underset{\text{Acetic anhydride.}}{\begin{matrix} CH_3CO\diagdown \\ \quad O \\ CH_3CO\diagup \end{matrix}} + \underset{\text{Water.}}{H_2O} = \underset{\text{Acetic acid.}}{2CH_3COOH}$$

The organic anhydrides may be formed by treating alkali salts of the acids with acid chlorides. Thus,



$$\underset{\text{Acetyl chloride}}{CH_3COCl} + \underset{\text{Sodium acetate.}}{NaOOCCH_3} = \underset{\text{Acetic anhydride.}}{\begin{matrix} CH_3CO\diagdown \\ \quad O \\ CH_3CO\diagup \end{matrix}} + \underset{\text{Sodium chloride.}}{NaCl}$$

(Acetic anhydride is frequently used to change alkali salts of higher acids to anhydrides.)

Basic anhydrides are commonly called *metallic oxides.* The analogy is plain from the following:

$$\underset{\text{Calcium hydroxide.}}{Ca(OH)_2} - \underset{\text{Water.}}{H_2O} = \underset{\text{Calcium oxide.}}{CaO}$$

Aromatic Alcohols.—See Alcohols, Aromatic.

Aromatic Oils (Volatile Oils).—See page 359.

Balsams.—L. *balsamum*, the resin of the balsam tree. Complex semiliquid or solid plant exudations which contain benzoic, cinnamic, or other aromatic acids. They are soluble in alcohol, but insoluble in water. The following are official: Balsamum peruvianum, balsamum tolutanum, benzoinum, styrax.

Bitter Principles.—The term "bitter principle" is used to designate those plant principles which have a bitter taste, but whose chemical properties are not known sufficiently well to warrant a chemical classification. The classification is but a temporary one, and most of the important bitter principles are now listed as either alkaloids, neutral principles, or glucosides.

Carbohydrate.—A term applied to a group of natural substances which are composed of the elements carbon, hydrogen, and oxygen, the latter two elements being present in the proportion of 2 : 1, or the proportion in which they exist in water. Starches and sugars typify carbohydrates.

$$\underset{\text{Cane-sugar.}}{C_{12}H_{22}O_{11}} \quad (C_{12} + 11H_2O)$$

Cleavage.—The splitting of a molecule into two or more molecules. Thus,

$$\underset{\text{Glucose.}}{C_6H_{12}O_6} = \underset{\text{Alcohol.}}{2C_2H_6O} + \underset{\text{Carbon dioxide.}}{2CO_2}$$

Compound Ethers.—See *Ethers, Compound.*

Dextrogyrate.—See *Dextrorotatory.*

Dextrorotatory.—Dextrogyrate. Having the power of rotating a plane of polarized light to the right.

Elæopten (el-ę-op′tēn).—Gr. meaning winged (volatile) oil. The liquid portion of volatile oils as distinguished from the solid portion, called stearopten.

Esters.—See *Ethers, Compound.*

Ethers.—Organic oxides, compounds formed by condensing two molecules of an alcohol, eliminating the elements of water. Thus,

$$\underset{\text{Alcohol.}}{2C_2H_5OH} = \underset{\text{Ether.}}{C_2H_5OC_2H_5} + \underset{\text{Water.}}{H_2O}$$

They may also be regarded as derivatives of alcohols by the replacement of the hydrogen of the hydroxyl by hydrocarbon radicals. Ethers may be simple, mixed, or compound.

Compound Ethers (*Esters*).—Sometimes called *organic salts.* Compounds formed by condensing a molecule of an alcohol with a molecule of an organic acid, eliminating the elements of water. Thus,

$$\underset{\text{Alcohol.}}{C_2H_5OH} + \underset{\text{Acetic acid.}}{CH_3COOH} = \underset{\text{Ethyl acetate.}}{CH_3COOC_2H_5} + \underset{\text{Water.}}{H_2O}$$

Mixed Ethers.—Compounds formed by condensing a molecule of one alcohol with a molecule of a different alcohol, eliminating the elements of water. Thus,

$$\underset{\text{Methyl alcohol.}}{CH_3OH} + \underset{\text{Ethyl alcohol.}}{C_2H_5OH} = \underset{\text{Methyl ethyl ether.}}{CH_3OC_2H_5} + \underset{\text{Water.}}{H_2O}$$

They may also be regarded as compounds in which two different hydrocarbon radicals are joined by the element oxygen. Thus,

$$\underset{\text{Methyl.}}{CH_3} + \underset{\text{Oxygen.}}{O} + \underset{\text{Ethyl.}}{C_2H_5} = \underset{\text{Methyl ethyl ether.}}{CH_3OC_2H_5}$$

Simple ethers are those in which the two hydrocarbon radicals are of the same kind. Thus, CH_3OCH_3 = Methyl ether.

Fats.—Solid glycerides of animal or vegetable origin, consisting very largely of mixtures of olein and stearin. Example: Adeps. (See also page 377.)

Fatty Oils.—See page 355.

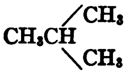
Fixed Oils.—See page 355.

Homologous Series.—Any series of organic compounds in which each member differs from the preceding or succeeding one by a common difference, as by CH_2, as in the methane series.

Isomers.—Organic compounds having the same empyric formula, but differing physically. Thus,

Normal Butane $CH_3CH_2CH_2CH_3$

Isobutane



$$CH_3CH\begin{matrix}/CH_3\\ \backslash CH_3\end{matrix}$$

There are three kinds of isomers:

Metamers.—Substances whose formulæ contain an equal number of atoms of the same elements. Thus,

CH_3CH_2OH	$CH_3—O—CH_3$
Alcohol.	Methyl ether.

Polymers.—Substances whose percentage composition is the same, but whose molecular weight is different.

$HCHO$	$(CH_2)_3O_3$
Formaldehyde.	Paraformaldehyde.

Stereo-isomers.—Substances which have the same constitutional formulæ, but exhibit differences in their crystalline form and in their behavior toward polarized light. Thus, there are four tartaric acids, a dextro, a lævo, and two inactive ones.

Glucosides.—A class of compounds which undergo hydrolysis, yielding glucose or an analogous compound of the sugar group as one of the products. This hydrolysis is usually accomplished by heating them with a dilute mineral acid or by acting on them with a ferment. They are chiefly vegetable in origin, and many of them are active therapeutic agents. They are, as a rule, colorless, crystalline compounds having a very bitter taste, and should be kept protected from the light and air.

They vary greatly in solubility, but the majority of them are soluble in water. A few of them contain nitrogen. Two are official: salicinum and strophanthinum. Important unofficial ones are amygdalin, arbutin, convolvulin, digitonin, digitoxin, jalapin, saponin, scammonin.

Glycerides.—Esters of glycerin and, generally, stearic, oleic, or palmitic acid. A very important group comprehending the fats and oils of both animal and vegetable origin.

Glycols.—Diatomic alcohols.

Gums.—True gums are amorphous plant exudations wholly soluble in cold water, not affected by iodine, but precipitated by alcohol and lead subacetate. Example: Acacia. Most substances listed in pharmaceutic price lists under "Gums" are not true gums. These latter consist largely of secretory products obtained by desiccating the saps of various plants—Inspissated Juices.

Gum Resins.—Plant exudations, either spontaneous or induced, consisting of a mixture of gum and resin. Examples: Asafœtida, cambogia.

Hydrocarbon.—A term applied to substances composed of the two elements only, hydrogen and carbon. Thus, C_2H_6 = Ethane, etc.

Hydrolysis.—The splitting of a molecule into two or more molecules by its taking up the constituents of water. Thus,

$$\underset{\text{Amygdalin.}}{C_{20}H_{27}NO_{11}} + \underset{\text{Water.}}{2H_2O} = \underset{\text{Glucose.}}{2C_6H_{12}O_6} + \underset{\text{Hydrocyanic acid.}}{HCN} + \underset{\text{Benzaldehyde.}}{C_6H_5CHO}$$

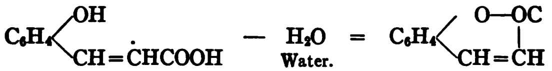
Inactive.—Said of a chemical which does not have the power of rotating a plane of polarized light.

Inner Anhydrides.—See *Lactones*.

Inner Esters.—See *Lactones*.

Ketones.—Organic chemicals containing the ketone radical = CO to which two hydrocarbon radicals are attached. They are considered as oxidation products of secondary alcohols. They differ from aldehydes mainly in the fact that while aldehydes unite readily with oxygen and form acids, the ketones are decomposed by oxidizing agents. The official ketones are acetonum and camphora.

Lactones, Inner Esters, Inner Anhydrides.—Products formed from hydroxy acids by the elimination of water from the molecule. This water is formed by the union of the hydroxyl radical with the hydrogen of the carboxyl radical. Thus,



Ortho-oxy-cinnamic acid. Coumarinum, N. F.

Lævogyrate.—See *Lævorotatory.*

Lævorotatory, Lævogyrate.—Having the power of rotating a plane of polarized light to the left.

Metamer.—See *Isometer.*

Mucilages.—A class of substances of plant origin, formerly considered as gums, but differing from them in that they are carbohydrates insoluble in water, but swelling enormously, so that they are in a condition near solution. They frequently contain starch. Example: Tragacanth. Compare Mucilages, page 353.

Neutral Principles.—Chemical constituents of plants which are neither acid nor alkaline in character and whose chemical constitution is not understood sufficiently to permit of a scientific classification. The list is gradually decreasing in length as chemical knowledge increases, as noted in the following list of official ones:

	1910.	1900.	1890.
Aloinum..........	Pentoside	Neutral Prin.	Neutral Prin.
Chrysarobinum....	Neutral Prin.	Neutral Prin.	Neutral Prin.
Elaterinum.......	Principle	Neutral Prin.	Neutral Prin.
Salicinum.........	Glucoside	Glucoside	Neutral Prin.
Santoninum.......	Lactone	Lactone	Neutral Prin.

Oils, Aromatic or Volatile.—See page 359.

Oils, Fatty or Fixed.—Liquid glycerides of animal or vegetable origin consisting very largely of olein. Example: Oleum olivæ, etc., see page 357.

Oleoresin.—Natural oleoresins are plant exudations, either spontaneous or induced, consisting of a mixture of volatile oil and resin. Examples: Copaiba, terebinthina, N. F., terebinthina laricis, N. F.; see also *Oleoresins*, page 369.

Organic Acids.—See *Acid, Organic*, page 84.

Pentoside.—An organic compound which upon undergoing hydrolysis yields a pentose as one of the products of the decomposition. Example: Aloin. A pentoside is analogous to a glucoside, but differing in that one of the products of decomposition is a pentose instead of a hexose (glucose).

Phenols.—Hydroxyl derivatives of benzene,

$$\underset{\text{Benzene.}}{C_6H_6} \qquad \underset{\text{Phenol.}}{C_6H_5OH}$$

They occupy a place between alcohols and organic acids; they form ethers, but do not oxidize to aldehydes and acids. They are called mono-, di-, or trihydroxy phenols, according to the number of hydrogen atoms of benzene that are replaced by hydroxyl.

Polymer.—See *Isometer.*

Radical.—See page 90.

Resinoids.—A class of unofficial, eclectic remedies, prepared by precipitating concentrated tinctures with water or acidulated water. They consist of either true resins or of mixtures containing resins.

The first one of this class was discovered by Dr. King and it is now official as resin of podophyllum. Early manufacturers, supposing it to be a definite body, called it podophyllin. There are more than fifty resinoids in use by eclectic practitioners. Their names, ending in *in*, are usually sufficiently significant to indicate their source. Thus, lupulin from humulus lupulus; hydrastin from hydrastis; sanguinarin from sanguinaria, etc.

The resinoids are not sufficiently pure to be regarded as definite chemical principles. Care is necessary to avoid confusing them with chemical principles of drugs, many of which are known by the same names. Thus, one of the alkaloids from sanguinaria is sanguinarin(e), one from hydrastis is hydrastin(e), and lupulin, of the U. S. P. VIII, is quite different from the resinoid lupulin, etc.

Resins.—Solid or semisolid, complex, amorphous plant products which are soluble in alcohol and volatile oils, more or less soluble in ether and chloroform, but wholly insoluble in water. They may be classified as:

Acid Resins.—Those possessing, in addition to the above characteristics, the property of uniting with alkalies to form resin soaps, as, for example, rosin.

Derived or Pharmaceutic Resins.—Those extracted from plants by means of a suitable solvent, usually alcohol, and precipitated from the concentrated tincture by water. Example: Resin of podophyllum, etc. See list, page 383. Some are separated from oleoresins by distillation. Example: Rosin.

Natural Resins.—Those which exude from plants spontaneously or after incision or the application of heat. Two are officinal, guaiacum and mastiche, N. F.

Saponification.—The decomposition of an ester (usually a glyceride of a fatty acid) by means of an alkali hydroxide (usually sodium hydroxide), with the formation of a soap (alkaline salt of a fatty acid).

$$\underset{\text{Olein.}}{C_3H_5(C_{18}N_{33}O_2)_3} + \underset{\text{Sodium hydroxide.}}{3NaOH} = \underset{\text{Soap (sodium oleate).}}{3NaC_{18}H_{33}O_2} + \underset{\text{Glycerine.}}{C_3H_5(OH)_3}$$

Simple Ethers.—See *Ethers, Simple.*

Stereo-isomer.—See *Isomer.*

Stearopten.—A solid crystalline substance separated from a volatile oil by long standing or by artificial cooling. The classification is unscientific and no longer recognized by the U. S. P. The important members, formerly in this group, are now given their proper chemical classification. They were camphor, menthol, thymol.

Volatile Oils.—See page 359.

Waxes.—Solid substances of vegetable or animal origin consisting principally of esters of monatomic alcohols and fatty acids, each containing a large number of carbon atoms. Wax is essentially melissyl palmitate, $C_{30}H_{61}.OOC_{16}H_{31}$, and spermaceti is cetyl palmitate, $C_{16}H_{33}.OOC_{16}H_{31}$. They are not as easily saponified as are the glycerides. Official examples: Cera alba, cera flava, cetaceum.

ORGANIC CHEMICALS AND PRODUCTS I

ACETANILIDUM—Acetanilid—Acetanil.—*Acetanilide; Antifebrin; Phenyl Acetamide*

A monacetyl derivative of aniline, $C_6H_5NHCH_3CO$ (135.08). Permanent in the air. Melts between 112° to 114° C.

Colorless, shining, micaceous laminæ, or a crystalline powder; odorless; slightly burning taste.

Neutral to litmus. Soluble in 190 mils of water and in 3.4 mils of alcohol.

Obtained by heating aniline with glacial acetic acid. It represents aniline ($C_6H_5NH_2$) with one of the hydrogens of the NH_2 group replaced by acetyl, CH_3CO.

$$\underset{\text{Acetic acid.}}{CH_3COOH} + \underset{\text{Aniline.}}{C_6H_5NH_2} = \underset{\text{Acetanilid.}}{C_6H_5NHCH_3CO} + \underset{\text{Water.}}{H_2O}$$

An ingredient in compound acetanilid powder, N. F., 70 per cent.

Used locally as an antiseptic dusting-powder.

Analgesic, antipyretic. Dose, 200 mg.

ACETONUM—Acetone—**Aceton.**—*Dimethyl-ketone*—CH_3CO-CH_3 (58.05)

Preserve in well-closed containers, in a cool place, remote from fire. Boils between 56° to 58° C.

Transparent, colorless, mobile liquid; sp. gv., about 0.790; characteristic ethereal odor; pungent, sweetish taste.

Neutral to litmus. Miscible in all proportions in water and alcohol.

Obtained as a by-product from the destructive distillation of wood in the manufacture of acetic acid.

Also prepared by the dry distillation of calcium acetate,

$$\underset{\text{Calcium acetate.}}{(CH_3COO)_2Ca} + \underset{\text{Heat.}}{\Delta} = \underset{\text{Acetone.}}{CH_3COCH_3} + \underset{\text{Calcium carbonate.}}{CaCO_3}$$

Used principally as a solvent for resinous principles in the varnish and rubber industry.

Rarely used internally.

ACETPHENETIDINUM—Acetphenetidin—**Acetphen.**—*Phenacetin*

A mono-acetyl derivative of para-amido-phenetol, C_6H_4-(QC_2H_5)$NHCH_3CO$ (179.11). It may also be regarded as acetanilid in which the para-hydrogen of the benzene ring is *replaced by the* ethoxy (C_2H_5O) radical.

Permanent in the air. Melts between 133° to 135° C.

White, glistening, crystalline scales or fine crystalline powder; odorless; slightly bitter taste, producing a faint numbing effect on the tongue.

Neutral to litmus. Soluble in 1310 mils of water and in 15 mils of alcohol.

Obtained from phenol by a series of reactions, the important steps being:

$$\underset{\text{Phenol.}}{C_6H_5OH} + \underset{\text{Nitric acid.}}{HNO_3} = \underset{\text{Para-nitro-phenol.}}{C_6H_4OHNO_2} + \underset{\text{Water.}}{H_2O}\text{, etc.}$$

$$\underset{\text{Para nitrophenol.}}{C_6H_4OHNO_2} + \underset{\text{Sodium hydroxide.}}{NaOH} = \underset{\text{Sodium nitrophenol.}}{C_6H_4ONaNO_2} + \underset{\text{Water.}}{H_2O}$$

$$\underset{\text{Sodium-nitro-phenol.}}{C_6H_4ONaNO_2} + \underset{\text{Ethyl iodide.}}{C_2H_5I} = \underset{\text{Para-nitro-phenetol.}}{C_6H_4OC_2H_5NO_2} + \underset{\text{Sodium iodide.}}{NaI}$$

$$\underset{\text{Para-nitro-phenetol.}}{C_6H_4OC_2H_5NO_2} + \underset{\text{Hydrogen.}}{3H_2} = \underset{\text{Para-amido-phenetol.}}{C_6H_4OC_2H_5NH_2} + \underset{\text{Water.}}{2H_2O}$$

$$\underset{\text{Para-amido-phenetol.}}{C_6H_4OC_2H_5NH_2} + \underset{\text{Acetic acid.}}{CH_3COOH} = \underset{\text{Acetphenetidin.}}{C_6H_4(OC_2H_5)NH.CH_3CO} + \underset{\text{Water.}}{H_2O}$$

Analgesic, antipyretic. Dose, 300 mg.

ACIDUM ACETICUM—Acetic Acid—**Acid. Acet.**

An aqueous solution containing 36 to 37 per cent. of CH_3COOH (60.03).

Slowly volatile. Preserve in glass-stoppered bottles.

Clear, colorless liquid; sp. gv., about 1.045; strong characteristic, vinegar-like odor; sharply acid taste.

Strongly acid to litmus. Miscible in all proportions in water and alcohol.

Obtained by the destructive distillation of wood (usually oak wood) and as a by-product in the production of charcoal.

The tarry distillate is neutralized with chalk, forming calcium acetate. The calcium acetate is transposed by sodium sulphate, and the sodium acetate in the resulting solution is crystallized. The purified sodium acetate is then distilled with sulphuric acid and the liberated acetic acid standardized.

It is a very good solvent. Used in preparing liquid glue.

It is an ingredient in diluted acetic acid, fluidextract of lobelia, 5 m/m; syrup of ipecac, 1 m/m.

Caustic. Administered only in diluted form internally.

ACIDUM ACETICUM DILUTUM—Diluted Acetic Acid—**Acid. Acet. Dil.**

An aqueous solution containing 5.7 to 6.3 per cent. of CH_3COOH (60.03).

Preserve in glass-stoppered bottles.

It possesses the properties of acidum aceticum.

Sp. gr., about 1.008.

Prepared by mixing 12 gm. of acetic acid with 61 gm. of water.

Used in preparing solution of ammonium acetate and as menstruum in preparing vinegar of squill.

Secretory stimulant. Dose, 2 mils.

ACIDUM ACETICUM GLACIALE—Glacial Acetic Acid—**Acid. Acet. Glac.**

Contains not less than 99 per cent. of CH_3COOH (60.03).

Preserve in glass-stoppered bottles. Boils between 117° and 118° C. It is solid below 14.5° C.

It possesses the properties of acidum aceticum.

Sp. gv., 1.047 to 1.050.

Obtained by distilling anhydrous sodium acetate with concentrated sulphuric acid.

Caustic; used externally in the removal of warts, corns, etc.

ACIDUM BENZOICUM—Benzoic Acid—**Acid. Benz.**

Contains, when dried to constant weight over sulphuric acid, not less than 99.5 per cent. of C_6H_5COOH (122.05).

Somewhat volatile. Preserve in well-closed containers, in a cool place, protected from light. Melts between 120° and 122° C.

Lustrous scales or friable needles. The synthetic acid is white; odorless or having a slight odor of benzaldehyde. The natural acid is white or yellowish, becoming darker upon exposure to light; has a slight odor of benzoin; pungent taste.

Acid to litmus. Soluble in 275 mils of water and in 2.3 mils of alcohol.

The natural acid is obtained from benzoin by sublimation.

The synthetic acid is prepared from hippuric acid (benzoyl glycocoll) by boiling it with strong hydrochloric acid (hydrolysis). The hippuric acid is obtained from the urine of cattle and horses.

$$\underset{\text{Benzoyl. Glycocoll.}}{C_6H_5CO.NHCH_2COOH} + \underset{\text{Water.}}{H_2O} = \underset{\text{Benzoic acid.}}{C_6H_5COOH} + \underset{\text{Glycocoll.}}{CH_2(NH_2)COOH}$$

It is also prepared from toluene by chlorination and hydrolysis under pressure.

$$\underset{\text{Toluene.}}{C_6H_5CH_3} + \underset{\text{Chlorine.}}{3Cl_2} = \underset{\text{Benzo trichloride.}}{C_6H_5CCl_3} + \underset{\text{Hydrochloric acid.}}{3HCl}$$

$$\underset{\text{Benzo trichloride.}}{C_6H_5CCl_3} + \underset{\text{Water.}}{2H_2O} = \underset{\text{Benzoic acid.}}{C_6H_5COOH} + \underset{\text{Hydrochloric acid.}}{3HCl}$$

Antiseptic. Dose, 500 mg.

ACIDUM CITRICUM—Citric Acid—**Acid. Cit.**

Contains not less than 99.5 per cent. of $C_3H_4(OH)(COOH)_3 + H_2O$ (210.08).

Efflorescent in warm air. Preserve in well-closed containers.

Colorless, translucent, right-rhombic prisms, or white powder; odorless; acid taste.

Acid to litmus. Soluble in 0.5 mil of water and in 1.8 mils of alcohol.

Obtained from the juice of limes and lemons. The juice is saturated with chalk-forming calcium citrate. The calcium is precipitated from the purified calcium citrate by sulphuric acid, and the citric acid crystallized from the clear solution.

An ingredient in syrup of citric acid, 1 g/m; syrup of orange, 0.5 g/m; syrup of lactucarium, 0.1 g/m.

Used in preparing the effervescent salts, *q. v.*, solution of magnesium citrate, 33 gm.; solution of potassium citrate, 6 g/m.

May b ubstitute for lemon-juice.

500 mg.

ACIDUM FORMICUM, N. F.—Formic Acid—**Acid. Formic.**

An aqueous solution containing 24 to 26 per cent. of HCOOH (46.02).

Volatile. Preserve in well-closed glass-stoppered bottles.

Colorless liquid; sp. gr., about 1.058; characteristic pungent odor; acid pungent taste.

Miscible with water and alcohol.

Obtained by heating together, in a retort, oxalic acid and glycerine.

$$\underset{\text{Oxalic acid.}}{H_2C_2O_4} + \underset{\text{Glycerine.}}{C_3H_5(OH)_3} = \underset{\text{Monoformin.}}{C_3H_5(OH)_2COOH} + \underset{\text{Carbon dioxide.}}{CO_2} + \underset{\text{Water.}}{H_2O}$$

$$\underset{\text{Monoformin.}}{C_3H_5(OH)_2COOH} + \underset{\text{Water.}}{H_2O} = \underset{\text{Formic acid.}}{HCOOH} + \underset{\text{Glycerine.}}{C_3H_5(OH)_3}$$

An ingredient in elixir of formates, N. F., 22.5 m/m; compound elixir of formates, N. F., 20 m/m.

Diuretic. Dose, 0.3 mil. Externally, rubefacient, vesicant.

ACIDUM GALLICUM — Gallic Acid — **Acid. Gallic.** — $C_6H_2(OH)_3COOH. + H_2O$ (188.06)

Permanent in air.

White or pale fawn-colored, silky, interlaced needles, or triclinic prisms; odorless; astringent, slightly acidulous taste.

Acid to litmus. Soluble in 87 mils of water and in 4.6 mils of alcohol.

Obtained by boiling tannic acid, which is the anhydride of gallic acid, or powdered nutgalls with dilute sulphuric acid, straining if necessary, and crystallizing the gallic acid from the solution.

It gives a bluish-black precipitate with ferric salts.

Mild astringent. Dose, 1 gm.

ACIDUM HYDROCYANICUM DILUTUM—Diluted Hydrocyanic Acid—**Acid. Hydrocyan. Dil.**—*Diluted Prussic Acid*

An aqueous solution containing 1.9 to 2.1 per cent. of HCN (27.02) and not more than 0.1 per cent. of HCl.

Very poisonous. Use caution in handling it. Does not keep well. Preserve in small, dark amber-colored, well-stoppered vials.

Colorless liquid, characteristic odor, resembling that of bitter almond.

Acid to litmus. Miscible in water and alcohol.

Obtained conveniently by transposing the required amount of silver cyanide with hydrochloric acid and filtering.

$$\underset{\text{Silver cyanide.}}{AgCN} + \underset{\text{Hydrochloric acid.}}{HCl} = \underset{\text{Hydrocyanic acid.}}{HCN} + \underset{\text{Silver chloride.}}{AgCl}$$

Poisonous, sedative. Dose, 0.1 mil.

ACIDUM LACTICUM—Lactic Acid—**Acid. Lact.**

A liquid containing lactic acid (optically inactive alpha-hydroxy-proprionic acid), CH_3, CHOH.COOH (90.05), and lactic anhydrides equivalent to a total of 85 to 90 per cent. of lactic acid.

Hygroscopic; preserve in glass-stoppered bottles.

Colorless or slightly yellowish, syrupy liquid; sp. gv., about 1.206; nearly odorless; acid taste.

Acid to litmus. Miscible in water and alcohol.

Obtained in various ways, such as, for example, by inducing lactic fermentation in a saccharine solution; neutralizing with chalk; transposing the calcium lactate thus formed by sulphuric acid and concentrating the liberated lactic acid by evaporation.

An ingredient in syrup of calcium lactophosphate, 6 m/m.

Tonic (locally caustic). Dose, 2 mils.

ACIDUM OLEICUM—Oleic Acid—**Acid. Oleic.**—$C_{17}H_{33}COOH$ (282.27)

Absorbs oxygen and becomes darker when exposed to air. Preserve in well-closed glass or stoneware containers, in a cool place.

Yellowish or brownish-yellow, oily liquid; sp. gv., about 0.895; peculiar lard-like odor and taste free from rancidity.

Practically insoluble in water. Soluble in alcohol.

Obtained from fats and oils by hydrolysis induced by superheated steam; chilling to about 5° C. and separating and preserving the liquid portion.

$$\underset{\text{Olein.}}{(C_{17}H_{33}COO)_3C_3H_5} + \underset{\text{Water.}}{3H_2O} = \underset{\text{Oleic acid.}}{3C_{17}H_{33}COOH} + \underset{\text{Glycerin.}}{C_3H_5(OH)_3}$$

Used in the preparation of oleates, oleate of mercury, about 75 per cent.

Emollient. Not used internally.

ACIDUM PHENYLCINCHONINICUM (IX)—Phenylcinchoninic Acid—**Acid. Phenylcinch.**—*Atophan*

Phenyl-quinoline-carboxylic acid, $C_6H_5.C_9H_5N.COOH$ (249.10).

Permanent in the air. Melts at about 210° C. with partial decomposition.

Colorless, small needles, or white to yellowish-white microcrystalline powder; odorless or having a slight odor resembling benzoic acid; bitter taste.

Insoluble in cold water, slightly soluble in cold alcohol.

Obtained by heating an alcoholic solution of pyroracemic acid, benzaldehyde and aniline.

Used for the relief of gouty and rheumatic pains. Dose, 500 mg.

ACIDUM SALICYLICUM—Salicylic Acid—**Acid. Salicyl.**

Contains, when dried to constant weight over sulphuric acid, not less than 99.3 per cent. of ortho-hydroxy-benzoic acid, $C_6H_4(OH)COOH$ (138.05).

Permanent in the air. Preserve in well-closed containers. Melts between 156° and 159° C.

White, fine, prismatic needles or bulky, crystalline powder; odorless; sweetish, afterward acrid taste. When prepared from methyl salicylate it may have a slightly yellow or pink tint and a slight gaultheria-like odor.

Acid to litmus. Soluble in 460 mils of water and in 2.7 mils of alcohol.

Natural salicylic acid is obtained from oil of birch by saponifying it with potassium hydroxide, distilling off the methyl alcohol and decomposing the residue of potassium salicylate in solution by hydrochloric acid and purifying the precipitated salicylic acid by recrystallization.

Synthetic salicylic acid is obtained in large quantities from phenol. The steps in the original (Kolbe) process are as follows:

$$\underset{\text{Phenol.}}{C_6H_5OH} + \underset{\text{Sodium hydroxide.}}{NaOH} = \underset{\text{Sodium phenolate.}}{C_6H_5ONa} + \underset{\text{Water.}}{H_2O}$$

$$\underset{\substack{\text{(Dry) sodium}\\ \text{phenolate.}}}{2C_6H_5ONa} + \underset{\text{Carbon dioxide.}}{CO_2} + \underset{\text{Heat.}}{\triangle} = \underset{\text{Disodium salicylate.}}{C_6H_4ONa.COONa} + \underset{\text{Phenol.}}{C_6H_5OH}$$

$$\underset{\text{Disodium salicylate.}}{C_6H_4ONa.COONa} + \underset{\text{Hydrochloric acid.}}{2HCl} = \underset{\text{Salicylic acid.}}{C_6H_4OHCOOH} + \underset{\text{Sodium chloride.}}{2NaCl}$$

It gives a bluish-violet coloration with solutions of ferric iron.

Antipyretic, antiseptic. Dose, 750 mg.

ACIDUM STEARICUM—Stearic Acid—**Acid. Stear.**—$C_{17}H_{35}$-COOH (284.29)

Permanent in the air. Melting-point not below 56° C. Congealing-point not below 54° C.

White or yellowish-white, hard, somewhat glossy solid; odorless or having a slight tallow-like odor; tasteless.

Almost insoluble in water, soluble in 21 mils of alcohol.

Obtained from fats such as tallow by saponification or by hydrolysis by superheated steam.

$$\underset{\text{Tallow (stearine).}}{(C_{17}H_{35}COO)_3C_3H_5} + \underset{\text{Water.}}{3H_2O} = \underset{\text{Stearic acid.}}{3C_{17}H_{35}COOH} + \underset{\text{Glycerine.}}{C_3H_5(OH)_3}$$

Employed in candle making.

Used in preparing glycerine suppositories, 20 g/n.

ACIDUM TANNICUM—Tannic Acid—**Acid. Tannic** – *tannic Acid; Tannin; Digallic Acid*

Approximately $(C_6H_2)_2.(OH)_5OCO.COOH$ (

Gradually darkens upon exposure to air
in well-closed containers, in a cool plac

Yellowish-white to light brown, am
or having a faint characteristic odor

Acid to litmus. Very soluble in w

Obtained usually from nutgalls, which are finely powdered and extracted with warm water. The aqueous extract is thoroughly agitated with about $\frac{1}{4}$ volume of ether. The lower, aqueous layer is then separated and evaporated under reduced pressure to a thick syrupy liquid, which is spread on glass plates and the drying completed in drying ovens.

It produces precipitates with most alkaloids and glucosides and with solutions of gelatin, albumin, and starch. It gives a blue-black color with ferric iron.

An ingredient in glycerite of tannic acid, 20 per cent.; troches of tannic acid, 6 g/n; ointment of tannic acid, 20 per cent.

Astringent. Dose, 500 mg.

ACIDUM TARTARICUM—Tartaric Acid—Acid. Tart.

Contains not less than 99.5 per cent. $C_2H_2(OH)_2(COOH)_2$ (150.05).

Permanent in the air.

Colorless, translucent, monoclinic prisms, or a white granular or fine powder; odorless; acid taste.

Acid to litmus. Soluble in 0.75 mil of water and in 3.3 mils of alcohol.

Obtained from wine lees or argol by dissolving them in water, nearly neutralizing the bitartrate with chalk, and forming calcium tartrate out of the neutral potassium tartrate thus produced by double decomposition with calcium chloride. The resulting precipitate of calcium tartrate is decomposed with sulphuric acid and the liberated tartaric acid purified by recrystallization.

An ingredient in seidlitz powder, 26 gm. for 12 powders.

Used in the preparation of the effervescent salts.

Refrigerant. Dose, 500 mg.

ACIDUM TRICHLORACETICUM—Trichloracetic Acid—Acid. Trichloracet.

Contains, when dried to constant weight over sulphuric acid, not less than 99 per cent. of CCl_3COOH (163.39).

Very deliquescent. Preserve in well-stoppered bottles, in a cool place, protected from light.

Colorless, rhombohedral crystals; slight characteristic odor; sharp, caustic taste.

Acid to litmus. Soluble in about 0.1 mil of water, very soluble in alcohol.

Obtained by oxidizing chloral hydrate with nitric acid and distilling, collecting the distillate coming over above 190° C.

Used for removing warts, and in dentistry for hardening the gums.

Cauterant, used externally.

ACONITINA—Aconitine—**Aconitin.**

An alkaloid, $C_{34}H_{47}O_{11}N$ (645.39), obtained from Aconite. The average yield is about 0.2 per cent.

Permanent in the air. Preserve in well-closed containers, protected from light. Melts at about 195° C.

Colorless or white rhombic tables or prisms; odorless. Caution: Very poisonous; produces a tingling and numbing sensation in dilutions of 1 : 100,000.

Alkaline to litmus. Very slightly soluble in water, soluble in 28 mils of alcohol.

Powerful sedative, active poison. Dose, 0.15 mg.

ÆTHER—Ether—*Sulphuric Ether*

A liquid containing 95.5 to 97.5 per cent. of ethyl oxide, $(C_2H_5)_2O$ (74.08), the remainder consisting of alcohol containing a little water.

Very volatile; boils at about 35° C., and inflammable. Preserve in partially filled, well-closed containers, in a cool place, remote from fire, and protected from light.

When ether is to be used for anesthesia it is to be dispensed only in small, well-closed containers, and is not to be used for this purpose if the container has been opened longer than twenty-four hours.

Transparent, colorless, mobile liquid; sp. gv., 0.713 to 0.71 characteristic odor; burning and sweetish taste.

Neutral to litmus. Soluble in about 12 volumes of wa readily miscible with alcohol.

Obtained from alcohol by dehydration. A mixture of alc and sulphuric acid is distilled, alcohol being gradually added to the still as long as ether is produced.

The reaction is usually written as taking place in two stages:

$$(1)\ \underset{\text{Alcohol.}}{C_2H_5OH} + \underset{\text{Sulphuric acid.}}{H_2SO_4} = \underset{\text{Ethyl sulphuric acid.}}{C_2H_5HSO_4} + \underset{\text{Water.}}{H_2O}$$

$$(2)\ \underset{\text{Ethyl sulphuric acid.}}{C_2H_5HSO_4} + \underset{\text{Alcohol.}}{C_2H_5OH} = \underset{\text{Ether.}}{(C_2H_5)_2O} + \underset{\text{Sulphuric acid.}}{H_2SO_4}$$

Employed as a solvent for fats, oils, alkaloids, etc. Used as the solvent in the preparation of oleoresins.

An ingredient in spirit of ether, 32.5 m/m.

Antispasmodic, stimulant, anesthetic. Dose, 1 mil.

ÆTHER ACETICUS, N. F. (U. S. P. VIII)—Acetic Ether—Æth. Acet.—*Ethyl Acetate*

A liquid ester containing not less than 96 per cent. by volume of $CH_3CO.OC_2H_5$ (88.06), the remainder consisting of alcohol and a little water.

Very volatile and inflammable. Preserve in well-stoppered bottles in a cool place, remote from fire, and protected from light. Boils between 72° to 77° C.

Colorless, transparent liquid; sp. gv., 0.887 to 0.895; fragrant, refreshing, slightly acetous odor; peculiar acetous and burning taste.

Neutral to litmus. Soluble in 10 mils of water; miscible with alcohol.

Obtained by distilling a mixture of sulphuric acid, alcohol, and anhydrous sodium acetate.

Employed in the manufacture of flavoring essences and as a solvent.

Used externally as an irritant, in liniments, etc.

Stimulant, carminative, antispasmodic. Dose, 1 mil.

ÆTHYLIS CARBAMAS—Ethyl Carbamate—Æthyl. Carbam. —*Urethane*

The ethyl ester of carbamic acid, $CO(OC_2H_5)NH_2$ (89.07).

Preserve in well-closed containers; melts between 48° and 50° C.

Colorless, columnar crystals or scales; odorless; cooling, saline taste.

Neutral to litmus. Soluble in 0.45 mil of water and in 0.8 mil of alcohol.

Obtained by several methods, one of them being from alcohol and urea nitrate by heating them together for several hours in a sealed tube at a temperature of about 125° C. It is purified by dissolving in water, shaking out with ether, distilling, and recrystallizing the residue from water.

$$\underset{\text{Alcohol.}}{C_2H_5OH} + \underset{\text{Urea nitrate.}}{(NH_2)_2COHNO_3} = \underset{\text{Ethyl carbamate.}}{CO(OC_2H_5)NH_2} + \underset{\text{Ammonium nitrate.}}{NH_4NO_3}$$

Hypnotic. Dose, 1 gm.

ÆTHYLIS CHLORIDUM—Ethyl Chloride—**Æthyl. Chlor.**—*Kelene*

Monochlorethane, CH_3CH_2Cl (64.50).

Very volatile and inflammable, boils between 12° and 13° C. Preserve in hermetically sealed containers, in a cool place, remote from fire, and protected from light.

Colorless, mobile liquid at low temperatures or under pressure; sp. gv., about 0.921 at 0° C.; characteristic, ethereal odor; burning taste.

Slightly soluble in water, freely soluble in alcohol.

Obtained by passing dry, hydrochloric acid gas into absolute alcohol and purifying the product.

$$\underset{\text{Alcohol.}}{C_2H_5OH} + \underset{\text{Hydrochloric acid.}}{HCl} = \underset{\text{Ethyl chloride.}}{C_2H_5Cl} + \underset{\text{Water.}}{H_2O}$$

Local anesthetic; by chilling, also general anesthetic; more pleasant, but not as safe as ether.

ÆTHYLMORPHINÆ HYDROCHLORIDUM (IX)—Ethylmorphine Hydrochloride—**Æthylmorph. Hydrochl.**—*Ethylmorphine Chloride; Dionin*

An alkaloid, $C_{17}H_{17}ON(OH)(OC_2H_5)HCl + 2H_2O$ (385.69).

Preserve in well-closed containers, protected from light. Melts at about 123° C., with decomposition.

White or yellowish microcrystalline powder; odorless; bitter taste.

Neutral to litmus. Soluble in 8 mils of water and in 22 mils of alcohol.

Obtained from morphine by ethylation.

Substitute for morphine to relieve pain. Dose, 15 mg.

ALCOHOL—Alcohol—*Ethyl Alcohol; Grain Alcohol; Grain Spirit*

A liquid containing not less than 92.3 per cent. by weight or 94.9 per cent. by volume at 15.56° C. of C_2H_5OH (46.05).

Volatile, inflammable. Preserve in well-closed containers in a cool place, remote from fire. Boils at about 78° C.

Colorless, transparent, mobile liquid; sp. gv., not above 0.810; slight, characteristic odor; burning taste.

Neutral to litmus. Soluble in all proportions in water.

Obtained from starch or from saccharine liquids by fermentation and separated and purified by distillation.

The starch of corn, rye, wheat, or potatoes is first subjected to saccharine fermentation (mashing process). Malt containing the ferment diastase is used, and the process is really one of hydrolysis. Thus,

$$\underset{\text{Starch.}}{3C_6H_{10}O_5} + \underset{\text{Water.}}{H_2O} = \underset{\text{Dextrin.}}{C_6H_{10}O_5} + \underset{\text{Maltose.}}{C_{12}H_{22}O_{11}}$$

and

$$\underset{\text{Dextrin.}}{C_6H_{10}O_5} + \underset{\text{Maltose.}}{C_{12}H_{22}O_{11}} + \underset{\text{Water.}}{2H_2O} = \underset{\text{Dextrose.}}{3C_6H_{12}O_6}$$

The saccharine liquid thus produced, called wort, is next fermented with yeast, producing a weak alcoholic liquid. Thus,

$$\underset{\text{Dextrose.}}{C_6H_{12}O_6} = \underset{\text{Alcohol.}}{2C_2H_5OH} + \underset{\text{Carbon dioxide.}}{2CO_2}$$

Used extensively as a solvent and preservative in many classes of medicinal preparations, as tinctures, fluidextracts, spirits, etc.

Used in making the official diluted alcohol, *q. v.*

Externally, stimulant and antiseptic.

Internally, stimulant; in large quantities it intoxicates. The U. S. P. gives no dose. Unofficial dose, 15 to 60 mils, largely diluted with water.

ALCOHOL DEHYDRATUM—Dehydrated Alcohol—**Alcohol Dehyd.**—*Alcohol Absolutum*, U. S. P. VIII

A liquid containing not less than 99 per cent. by weight of C_2H_5OH (46.05).

Very hygroscopic, volatile, and inflammable. Preserve in well-closed containers, in a cool place, remote from fire.

Colorless, transparent, mobile liquid; sp. gv., about 0.79; characteristic odor; burning taste.

Neutral to litmus. Soluble in all proportions in water.

Obtained from alcohol by dehydration, usually by the use of quicklime and subsequent rectification.

Used as a solvent and dehydrating agent.

ALCOHOL DILUTUM—Diluted Alcohol—**Alcohol Dil.**

A liquid containing 41 to 42 per cent. by weight or 48.4 to 49.5 per cent. by volume of C_2H_5OH (46.05).

Prepared by mixing alcohol with an equal volume of water —50 mils of alcohol and 50 mils of water when mixed will contract to about 97 mils.

Used as a solvent.

Denatured Alcohol.—Alcohol rendered unfit for beverage or medicinal purpose by mixing with it various substances as prescribed by the United States Internal Revenue Department. Such alcohol may be withdrawn from bond without payment of the internal revenue tax, and can be used in the arts and industries, but cannot be used for medicinal purposes.

Among the common denaturants are methyl alcohol, benzin, and pyridine.

Proof Spirit.—A term used by excise officers to designate an alcoholic liquid containing 50 per cent. by volume of C_2H_5OH. (This is not diluted alcohol, U. S. P.)

Methylated spirit for industrial purposes is a mixture of approximately 19 volumes of 86 per cent. alcohol by volume with 1 volume of commercial methyl alcohol.

Cologne Spirit.—A solution of various odorous oils in alcohol, Cologne (British); also a term formerly used to designate a very pure grade of alcohol. About equivalent to U. S. P. alcohol.

Colonial Spirit.—A purified methyl alcohol.

Columbian Spirit.—A purified methyl alcohol.

Wood Spirit.—Methyl alcohol.

Wood Naptha.—Crude methyl alcohol.

Pyroligneous Alcohol or Spirit.—Crude methyl alcohol.

Potato Spirit.—Fusel oil, amyl alcohol.

ALOINUM—Aloin—**Aloin.**

A pentoside or mixture of pentosides obtained from aloes, varying in chemical composition, physical and chemical properties according to source.

Darkens upon exposure to light and air. Preserve in well-closed containers, protected from light.

Lemon-yellow to dark yellow, microcrystalline powder, or minute acicular crystals; odorless or possessing a slight odor of aloes; intensely bitter taste.

Neutral or slightly acid to litmus. Soluble in about 65 mils of water and in about 12 mils of alcohol. Solubility varies with its composition.

Obtained from a clear, acidulated (HCl) aqueous solution of aloes by evaporation and crystallization.

Cathartic, cholagogue, tonic. Dose, 15 **mg.**

AMYLIS NITRIS—Amyl Nitrite—**Amyl. Nitris**

A liquid containing not less than 80 per cent. of $C_5H_{11}NO_2$ (117.10), chiefly iso-amyl nitrite.

Very volatile and inflammable. Preserve in hermetically sealed glass bulbs (pearls), in a cool place, protected from light.

Yellowish, clear liquid; sp. gv., 0.865 to 0.875; peculiar, ethereal, fruity odor; pungent, aromatic taste.

Almost insoluble in water; soluble in alcohol.

Obtained by a process analogous to that for ethyl nitrite (see page 394), substituting amyl alcohol for the ethyl alcohol.

Antispasmodic. Administered by inhalation. Dose, 0.2 mil.

AMYLUM—Starch—**Amyl.**—*Cornstarch*

The starch separated from the grain of Zea Mays ($C_6H_{10}O_5$). (The molecular weight has not been definitely determined.)

Permanent in the air. Preserve in closed containers.

White fine powder; odorless; slight characteristic taste.

Neutral to litmus. Insoluble in water and alcohol.

Obtained from corn, which is first steeped in water to remove oil and inorganic matter; then ground and washed with water through strainers. The starch is allowed to deposit, then treated with caustic alkali to free it from gluten, traces of oil, etc., and finally washed free of alkali, and dried.

Used for the preparation of paste, dextrin and various "sizes," and as a dusting-powder.

Used in preparing glycerite of starch, 10 per cent., and as a diluent in several of the powdered extracts.

Nutrient and demulcent when boiled. U. S. P. gives no dose.

ANETHOL, N. F.—Anethol

The methyl ether of para-propenyl phenol, $C_6H_4.C_3H_5.OCH_3$ (148.1).

Preserve in well-stoppered, amber-colored bottles, protected from light and air.

Colorless or faintly yellow, highly refractive liquid at a temperature of 23° C. or above; sp. gv., 0.984 to 0.986; aromatic odor of anise; sweet taste.

Obtained from such oils as anise, star anise, and fennel by fractionating, chilling, and crystallizing.

Carminative, expectorant. Dose, 0.2 mil.

ANTIPYRINA—Antipyrine—**Antipyr.**—*Phenazone*

Phenyldimethylpyrazolon, $C_3HON_2(CH_3)_2C_6H_5$ (188.12).

Permanent in the air. Preserve in well-closed containers. Melts between 111° and 113° C.

White crystalline powder or tabular crystals; almost odorless; slightly bitter taste. Gives a red coloration with ferric salts.

Neutral to litmus. Soluble in less than 1 mil of water and in 1.3 mils of alcohol.

Obtained conveniently by the Knorr process, which is the condensation of phenyl hydrazine and aceto-acetic ether and methylation of the product.

$$\underset{\text{Phenylhydrazine.}}{C_6H_5NH.NH_2} + \underset{\text{Aceto-acetic-ether.}}{CH_3CO.CH_2CO.OC_2H_5} =$$

$$\underset{\text{Phenyl-methyl-iso-pyrazolon.}}{C_6H_5N.CO.CH{:}C(CH_3).NH} + \underset{\text{Water.}}{H_2O} + \underset{\text{Alcohol.}}{C_2H_5OH}$$

$$\underset{\text{Phenyl-methyl-iso-pyrazolon.}}{C_6H_5N.CO.CH{:}C(CH_3).NH} + \underset{\text{Methyl iodide.}}{CH_3I} =$$

$$\underset{\text{Antipyrine.}}{C_3HON_2(CH_3)_2C_6H_5} + \underset{\text{Hydriodic acid.}}{HI}$$

Antipyretic. Dose, 300 mg.

APOMORPHINÆ HYDROCHLORIDUM—Apomorphine Hydrochloride—**Apomorph. Hydrochl.**

The hydrochloride, $C_{17}H_{17}O_2NHCl + \frac{1}{2}H_2O$ (312.62), of an alkaloid prepared from morphine by the abstraction of one molecule of water.

Acquires a greenish tint upon exposure to light and air, which is hastened by alkalies.

Preserve in small, well-stoppered vials which have been previously rinsed with diluted hydrochloric acid and dried. Protect from light. It must be rejected if it imparts at once an emerald-green color to 100 parts of distilled water when shaken with it in a test-tube.

White or grayish-white, minute, glistening, monoclinic prisms; odorless; slightly bitter taste.

Neutral to litmus. Soluble in 50 mils of either water or alcohol.

Obtained by heating 1 part of morphine and 20 parts of concentrated hydrochloric acid together in a sealed tube for three hours at a temperature of 140° to 150° C. and purifying the product.

Expectorant. Dose, 3 mg. Emetic, by mouth. Dose, 10 mg. Emetic, hypodermic. Dose, 5 mg.

ATROPINA—Atropine—**Atrop.**

An alkaloid, $C_{17}H_{23}O_3N$ (289.19), obtained from belladonna and some other plants of the Solanaceæ. The average yield *from belladonna* root is 0.2 to 0.8 per cent.

Preserve in well-closed containers, protected from light. Melts between 114° and 116° F.

White, rhombic prisms; odorless. Caution: Very poisonous; bitter, acrid taste.

Alkaline to litmus. Soluble in 455 mils of water and in 2 mils of alcohol.

Sedative, mydriatic, poisonous. Dose, 0.5 mg.

ATROPINÆ SULPHAS—Atropine Sulphate—**Atrop. Sulph.**

The sulphate, $(C_{17}H_{23}O_3N)_2H_2SO_4 + H_2O$ (694.49), of the alkaloid atropine.

Efflorescent in dry air.

Preserve the same as atropine.

White, crystalline powder or microscopic needles and prisms; odorless. Caution: Poisonous; taste bitter and nauseating.

Neutral to litmus. Soluble in 0.4 mil of water and in 5 mils of alcohol.

Mydriatic, sedative, poisonous. Dose, 0.5 mg.

BENZALDEHYDUM—Benzaldehyde—**Benzaldehyd.**

Contains not less than 85 per cent. of C_6H_5CHO (106.05).

Volatile. Oxidizes to benozic acid when exposed to the air. Preserve in small, well-stoppered bottles, protected from light.

Colorless or yellowish, strongly refractive liquid; sp. gv., about 1.045; bitter almond-like odor; burning aromatic taste.

Slightly soluble in water. Miscible with alcohol.

Obtained from oil of bitter almonds by simply removing the hydrocyanic acid thereform by agitation with milk of lime and a small quantity of solution of iron sulphate, allowing it to stand several days, and then distilling with steam.

Also prepared synthetically from toluene by the following series of reactions and subsequent purification:

$$\underset{\text{Toluene.}}{C_6H_5CH_3} + \underset{\text{Chlorine.}}{Cl_2} = \underset{\text{Benzyl chloride.}}{C_6H_5CH_2Cl} + \underset{\text{Hydrochloric acid.}}{HCl}$$

$$\underset{\text{Benzyl chlorid.}}{2C_6H_5CH_2Cl} + \underset{\text{Lead nitrate.}}{Pb(NO_3)_2} + \underset{\text{Heat.}}{\triangle} = \underset{\text{Benzaldehyde.}}{2C_6H_5CHO} + \underset{\text{Lead chloride}}{PbCl_2} + \underset{\text{Water.}}{H_2O} + \underset{\text{Nitrogen trioxide.}}{N_2O_3}$$

Used as a flavoring agent and in perfumery. **Dose, 0.03**

Obtained usually from nutgalls, which are finely powdered and extracted with warm water. The aqueous extract is thoroughly agitated with about $\frac{1}{4}$ volume of ether. The lower, aqueous layer is then separated and evaporated under reduced pressure to a thick syrupy liquid, which is spread on glass plates and the drying completed in drying ovens.

It produces precipitates with most alkaloids and glucosides and with solutions of gelatin, albumin, and starch. It gives a blue-black color with ferric iron.

An ingredient in glycerite of tannic acid, 20 per cent.; troches of tannic acid, 6 g/n; ointment of tannic acid, 20 per cent.

Astringent. Dose, 500 mg.

ACIDUM TARTARICUM—Tartaric Acid—**Acid. Tart.**

Contains not less than 99.5 per cent. $C_2H_2(OH)_2(COOH)_2$ (150.05).

Permanent in the air.

Colorless, translucent, monoclinic prisms, or a white granular or fine powder; odorless; acid taste.

Acid to litmus. Soluble in 0.75 mil of water and in 3.3 mils of alcohol.

Obtained from wine lees or argol by dissolving them in water, nearly neutralizing the bitartrate with chalk, and forming calcium tartrate out of the neutral potassium tartrate thus produced by double decomposition with calcium chloride. The resulting precipitate of calcium tartrate is decomposed with sulphuric acid and the liberated tartaric acid purified by recrystallization.

An ingredient in seidlitz powder, 26 gm. for 12 powders.

Used in the preparation of the effervescent salts.

Refrigerant. Dose, 500 mg.

ACIDUM TRICHLORACETICUM—Trichloracetic Acid—**Acid. Trichloracet.**

Contains, when dried to constant weight over sulphuric acid, not less than 99 per cent. of CCl_3COOH (163.39).

Very deliquescent. Preserve in well-stoppered bottles, in a *cool place, protected* from light.

Colorless, rhombohedral crystals; slight characteristic odor; sharp, caustic taste.

Acid to litmus. Soluble in about 0.1 mil of water, very soluble in alcohol.

Obtained by oxidizing chloral hydrate with nitric acid and distilling, collecting the distillate coming over above 190° C.

Used for removing warts, and in dentistry for hardening the gums.

Cauterant, used externally.

ACONITINA—Aconitine—**Aconitin.**

An alkaloid, $C_{34}H_{47}O_{11}N$ (645.39), obtained from Aconite. The average yield is about 0.2 per cent.

Permanent in the air. Preserve in well-closed containers, protected from light. Melts at about 195° C.

Colorless or white rhombic tables or prisms; odorless. Caution: Very poisonous; produces a tingling and numbing sensation in dilutions of 1 : 100,000.

Alkaline to litmus. Very slightly soluble in water, soluble in 28 mils of alcohol.

Powerful sedative, active poison. Dose, 0.15 mg.

ÆTHER—Ether—*Sulphuric Ether*

A liquid containing 95.5 to 97.5 per cent. of ethyl oxide, $(C_2H_5)_2O$ (74.08), the remainder consisting of alcohol containing a little water.

Very volatile; boils at about 35° C., and inflammable. Preserve in partially filled, well-closed containers, in a cool place, remote from fire, and protected from light.

When ether is to be used for anesthesia it is to be dispensed only in small, well-closed containers, and is not to be used for this purpose if the container has been opened longer than twenty-four hours.

Transparent, colorless, mobile liquid; sp. gv., 0.713 to 0.716; characteristic odor; burning and sweetish taste.

Neutral to litmus. Soluble in about 12 volumes of water, readily miscible with alcohol.

Obtained from alcohol by dehydration. A mixture of alcohol

BROMOFORMUM—Bromoform—**Bromof.**

A liquid containing about 96 per cent. by weight of $CHBr_3$ (252.77) and about 4 per cent. of dehydrated alcohol.

Volatile, not readily inflammable. Preserve in glass-stoppered bottles, in a cool place, protected from light.

Transparent, colorless, heavy, mobile liquid; sp. gv., 2.595 to 2.620; ethereal odor; sweet taste resembling chloroform.

Slightly soluble in water. Miscible with alcohol.

Obtained from alcohol or acetone by the action of bromine in the presence of an alkali, and distilling. Analogous to the reactions for the preparation of chloroform and iodoform.

$$\underset{\text{Sodium hydroxide.}}{8NaOH} + \underset{\text{Bromine.}}{4Br_2} = \underset{\text{Sodium hypobromite.}}{4NaBrO} + \underset{\text{Sodium bromide.}}{4NaBr} + \underset{\text{Water.}}{4H_2O}$$

$$\underset{\text{Alcohol.}}{C_2H_5OH} + \underset{\text{Sodium hypobromite.}}{NaBrO} = \underset{\text{Aldehyde.}}{CH_3CHO} + \underset{\text{Sodium bromide.}}{NaBr} + \underset{\text{Water.}}{H_2O}$$

$$\underset{\text{Aldehyde.}}{CH_3CHO} + \underset{\text{Sodium hypobromite.}}{3NaBrO} = \underset{\text{Tri-bromaldehyde.}}{CBr_3CHO} + \underset{\text{Sodium hydroxide.}}{3NaOH}$$

$$\underset{\text{Tribromaldehyde.}}{CBr_3CHO} + \underset{\text{Sodium hydroxide.}}{NaOH} = \underset{\text{Bromoform.}}{CHBr_3} + \underset{\text{Sodium formate.}}{HCOONa}$$

Written as one equation, thus:

$$C_2H_5OH + 6NaOH + 4Br_2 = CHBr_3 + HCOONa + 5NaI + 5H_2O$$

Or

$$\underset{\text{Sodium hydroxide.}}{6NaOH} + \underset{\text{Bromine.}}{3Br_2} = \underset{\text{Sodium hypobromite.}}{3NaBrO} + \underset{\text{Sodium bromide.}}{3NaBr} + \underset{\text{Water.}}{3H_2O}$$

$$\underset{\text{Acetone.}}{CH_3CO.CH_3} + \underset{\text{Sodium hypobromite.}}{3NaBrO} = \underset{\text{Tri-bromacetone.}}{CH_3COCBr_3} + \underset{\text{Sodium hydroxide.}}{3NaOH}$$

$$\underset{\text{Tri-bromacetone.}}{CH_3COCBr_3} + \underset{\text{Sodium hydroxide.}}{NaOH} = \underset{\text{Bromoform.}}{CHBr_3} + \underset{\text{Sodium acetate.}}{CH_3COONa}$$

Written as one equation, thus:

$$CH_3CO.CH_3 + 4NaOH + 3Br_2 = CHBr_3 + CH_3COONa + 3NaBr + 3H_2O$$

Sedative. Used in the treatment of whooping-cough. Dose, *0.2 mil.*

CAFFEINA—Caffeine—**Caffein.**—*Theine*

A feebly basic substance (alkaloid), trimethylxanthine, $C_5H(CH_3)_3O_2N_4 + H_2O$ (212.14). The average yield from tea is 1 to 4 per cent.; from coffee, 1 to 2 per cent.

Efflorescent in dry air. Preserve in well-closed containers.

White, flexible, silky, glistening needles, usually matted together in fleecy masses; odorless; bitter taste.

Neutral to litmus. Soluble in 46 mils of water and in 66 mils of alcohol.

Obtained from tea and tea dust, from coffee, and also synthetically by methylating theobromine.

Used in preparing citrated caffeine, 50 per cent.

Cardiac tonic, diuretic. Dose, 150 mg.

CAFFEINA CITRATA—Citrated Caffeine—**Caffein. Cit.**

Contains, when dried at 80° C., not less than 48 per cent. of anhydrous caffeine, $C_8H_{10}O_2N_4$ (194.12).

Preserve in well-closed containers.

White, fine powder; odorless; slightly bitter, acid taste.

Acid to litmus. Soluble in water and alcohol.

Prepared by dissolving 50 gm. of citric acid in 100 mils of hot distilled water, adding 50 gm. of caffeine, evaporating to dryness on a water-bath, and pulverizing.

Used in preparing effervescent citrated caffeine, 4 per cent.

Cardiac tonic, diuretic. Dose, 300 mg.

CAFFEINA CITRATA EFFERVESCENS.—See page 386.

CAFFEINÆ SODIO-BENZOAS (IX)—Caffeine Sodio-Benzoate —**Caff. Sod. Benz.**

A mixture of caffeine and sodium benzoate containing, when dried at 80° C., 46 to 50 per cent. of caffeine, $C_8H_{10}O_2N_4$ (194.12), and the remainder, sodium benzoate, C_6H_5COONa (144.04).

Preserve in well-closed containers.

White powder; odorless; slightly bitter taste.

Neutral or either slightly alkaline or acid to litmus. Soluble in 1.1 mils of water and in 30 mils of alcohol.

Obtained by dissolving 50 gm. of caffeine in a solution of 50 gm. of sodium benzoate and evaporating to dryness.

Diuretic. Dose, by mouth, 300 mg.

Cardiac and respiratory stimulant. Dose, hypodermic, 200 mg.

CAMPHORA—Camphor—**Camph.**

A dextrorotatory ketone, $C_9H_{16}CO$ (152.13).

Volatile. Preserve in well-closed containers, in a cool place. Melts between 174° and 177° C.

White, translucent masses or granules of a tough consistence; sp. gv., about 0.990; penetrating, characteristic odor; pungent aromatic taste.

Slightly soluble in water; freely soluble in alcohol.

Obtained by distilling the wood of the root, stem, and the leaves of the camphor tree. Also prepared synthetically from oil of turpentine. The synthetic camphor is optically inactive and is not recognized in the U. S. P.

Used in preparing camphor-water, 0.8 g/m; belladonna liniment, 5 g/m; camphor liniment, 20 per cent.; soap liniment, 4.5 g/m, *q. v.*; spirit of camphor, 10 g/m; camphorated tincture of opium, 0.4 g/m, *q. v.* Also present in chloroform liniment, 3.15 g/m.

Expectorant, antispasmodic, diaphoretic, stimulant.

Dose, by mouth, 200 mg. Dose, hypodermic, 100 mg.

CAMPHORA MONOBROMATA—Monobromated Camphor—**Camph. Monobrom.**

Ortho-monobromcamphor, $C_9H_{15}Br.CO$ (231.04).

Permanent in the air. Decomposed by prolonged exposure to sunlight. Preserve in well-closed containers, in a cool place. Melts between 74° and 76° C.

Colorless, prismatic needles or scales, or powder; mild camphoraceous odor and taste.

Almost insoluble in water, soluble in 6.5 mils of alcohol.

Obtained by the action of bromine on camphor and purified by recrystallization from hot alcohol or benzin.

Sedative. Dose, 125 mg.

CARAMEL, N. F.—Caramel—**Caram.**—*Saccharum Ustum; Burnt Sugar Coloring*

A concentrated aqueous solution of burnt sugar; approximate formula, $C_{12}H_{18}O_9$, yielding upon incineration not more than 8 per cent. of ash.

Dark brown, thick liquid; sp. gv., not less than 1.35; characteristic odor of burnt sugar; pleasant, bitter taste.

Soluble in all proportions in water. Soluble in diluted alcohol, but insoluble in alcohol of 80 per cent. or more by volume.

Obtained by heating sugar or glucose to a temperature of 180° to 200° C. until a dark brown mass results, a small amount of alkali or alkali carbonate being added during the heating.

$$\underset{\text{Cane-sugar.}}{C_{12}H_{22}O_{11}} + \underset{\text{Heat.}}{\Delta} = \underset{\text{Caramel.}}{C_{12}H_{18}O_9} + \underset{\text{Water.}}{2H_2O}$$

Used for coloring pharmaceutics, beverages, leather, etc.

CARMINUM, N. F.—Carmine—**Carmin.**

The aluminum lake of the coloring principle (carminic acid, $C_{11}H_{12}O_6.2H_2O$) obtained from cochineal, yielding not more than 12 per cent. of ash.

Preserve in well-stoppered, amber-colored bottles, protected from light.

Bright-red, irregular, angular fragments or powder; odorless; tasteless.

Slightly soluble in water, to which it imparts a red color; freely soluble in ammonia-water and alkaline liquids.

Obtained usually by precipitating an aqueous infusion of cochineal with alum.

Used in coloring pharmaceutics, for staining histologic specimens, etc.

CERA ALBA—White Wax—**Cer. Alb.** (Not regarded as a chemical.) See *Cera Flava.*

Permanent in the air. Melts between 62° and 65° C.

Yellowish-white solid, somewhat translucent in thin layers; sp. gv., 0.950 to 0.960; faint characteristic odor; free from rancidity; nearly tasteless.

Insoluble in water; sparingly soluble in alcohol.

Obtained by bleaching yellow wax. The wax is reduced to thin sheets and exposed to light, air, and moisture. That bleached by chlorine is considered of inferior quality.

Used in preparing light colored cerates, ointments, and "creams" to impart the desired consistency.

An ingredient in cerate, 30 per cent.; ointment, 20 per cent., *q. v.*; ointment of rose-water, 12 per cent.; also present in ointments of tannic acid, nutgall, and phenol.

CERA FLAVA—Yellow Wax—**Cer. Flav.**

An "animal product" secreted by the honey bee; not a pure chemical, but consists of about 80 per cent. myricin or melissyl palmitate, $C_{15}H_{31}COOC_{30}H_{61}$, and 15 per cent. of cerotic acid, $C_{26}H_{53}COOH$.

Permanent in the air; melts between 62° and 65° C.

Yellow or grayish-brown solid; sp. gv., 0.950 to 0.960; agreeable, honey-like odor; faint characteristic taste.

Insoluble in water; sparingly soluble in alcohol.

Obtained from the honey-comb of the honey bee by melting it in water, separating, and straining.

Used in colored ointments and cerates to impart the desired consistency.

An ingredient in cantharides cerate, 17½ per cent., *q. v.*; rosin cerate, 15 per cent.; tar ointment, 15 per cent.; rosin plaster, 6 per cent., *q. v.*; diluted mercurial ointment, when necessary, 5 per cent. or more.

CETACEUM—Spermaceti—**Cetac.**

A concrete fatty substance the chief constituent of which is cetyl palmitate (cetin), $C_{15}H_{31}COO.C_{16}H_{33}$.

Becomes yellow in color and rancid on prolonged exposure to air. Melts between 42° and 50° C.

White, somewhat translucent, slightly unctuous masses, with a scaly, crystalline fracture and pearly luster; sp. gv., 0.938 to 0.944; very faint odor; bland, mild taste.

Slightly acid to litmus. Insoluble in water and nearly so in alcohol.

Obtained from the oily liquid found in a large cavity in the upper jaw of the sperm whale. This liquid, which is removed soon after the whale is killed, soon congeals into a yellow mass. It is then drained and pressed to remove the oily portion (sperm oil), after which it is purified by melting in water; skimming; boiling with weak alkali; washing with water, and finally congealed.

Employed as a lenitive, and as a hardening agent in cerates, ointments, and "creams."

An ingredient in ointment of rose-water, 12.5 per cent.

CHLORALUM HYDRATUM — Hydrated Chloral — **Chloral. Hydrat.**—*Chloral; Chloral Hydrate*

Trichloraldehyde with the elements of one molecule of water, $CCl_3CHO + H_2O$ (165.4).

Slowly volatile when exposed to air. Somewhat hygroscopic. Preserve in tightly stoppered bottles, in a cool place, protected from light.

Colorless, transparent, rhomboidal crystals; aromatic, penetrating, and slightly acrid odor; bitterish, caustic taste.

Neutral to litmus. Soluble in 0.25 mil of water and in 1.3 mils of alcohol.

Obtained from liquid chloral by adding water to it. The liquid chloral is obtained by passing dry chlorine gas into cooled absolute alcohol and purifying by washing with concentrated sulphuric acid, and rectifying.

$$\underset{\text{Alcohol.}}{CH_3CH_2OH} + \underset{\text{Chlorine.}}{Cl_2} = \underset{\text{Aldehyde.}}{CH_3CHO} + \underset{\text{Hydrochloric acid.}}{2HCl}$$

$$\underset{\text{Aldehyde.}}{CH_3CHO} + \underset{\text{Chlorine.}}{3Cl_2} = \underset{\text{Chloral.}}{CCl_3CHO} + \underset{\text{Hydrochloric acid.}}{3HCl}$$

Used as a decolorizing agent in microscopy.

Hypnotic, sedative, antiseptic. Dose, 500 mg.

CHLOROFORMUM—Chloroform—**Chlorof.**

Trichlormethane, $CHCl_3$ (119.39), containing not more than 1 per cent. by weight of alcohol.

Very volatile, but not inflammable; noxious gases are produced when it is volatilized in the presence of a naked flame. Preserve in well-stoppered bottles, in a cool place, protected from light. Boils at about 61° C.

Colorless, clear, mobile liquid; sp. gv., 1.474 to 1.478; characteristic, ethereal odor; burning, sweet taste.

Soluble in 210 volumes of water; miscible with alcohol.

Obtained from alcohol or acetone by substituting Cl for Br in the reactions given under *Bromoformum*, page 226.

Used as a solvent for resins, alkaloids, etc.

Stimulant; anesthetic, local and general; antispasmodic.

Dose, 0.3 mil.

CHRYSAROBINUM—Chrysarobin—**Chrysarob.**

A mixture of neutral principles having no definite chemical formula, but consisting chiefly of pure chrysarobin, $C_{30}H_{26}O_7$.

Preserve in well-closed containers, protected from light.

Brownish to orange-yellow, microcrystalline powder; odorless; tasteless; irritating to mucous membranes.

Very slightly soluble in water; soluble in 385 mils of alcohol.

Obtained from goa powder, a substance found deposited in the wood of the araroba tree, by extracting with hot benzene.

Used in the form of ointment and suppository. It permanently discolors clothing, but stains on the skin may be removed with a weak solution of chlorinated lime.

An ingredient in chrysarobin ointment, 6 per cent.

Antiparasitic, gastro-intestinal irritant. Dose, 30 mg.

CINCHONIDINÆ SULPHAS—Cinchonidine Sulphate—**Cinchonid. Sulph.**

The sulphate, $(C_{19}H_{22}ON_2)_2.H_2SO_4 + 3H_2O$ (740.53), of the lævorotatory alkaloid cinchonidine. The average yield of cinchonidine from red cinchona is 1 to 5 per cent.; from yellow cinchona, 0.4 to 1.2 per cent.

Permanent in the air. Preserve in well-closed containers, protected from light.

White, glistening, silky needles or prisms; odorless; bitter taste.

Neutral or faintly alkaline to litmus. Soluble in 65 mils of water and in 90 mils of alcohol.

Obtained from the bark of several species of cinchona, especially "red" cinchonas, and as a by-product in the manufacture of quinine sulphate.

About one-third as strong, and less apt than quinine, in full doses, to produce fulness in the head (cinchonism).

Tonic, antiperiodic. Dose, 150 mg.

CINCHONINÆ SULPHAS—Cinchonine Sulphate—**Cinchonin. Sulph.**

The sulphate, $(C_{19}H_{22}ON_2)_2H_2SO + 2H_2O$ (722.51), of the dextrorotatory alkaloid cinchonine, isomeric with cinchonidine.

The average yield of cinchonine from yellow cinchona is 0.1 to 1.1 per cent.; from red cinchona, about 0.4 per cent.

Permanent in the air. Preserve in well-closed containers protected from light.

White, lustrous, prismatic crystals; odorless; very bitter taste.

Neutral or slightly alkaline to litmus. Soluble in 60 mils of water and in 12.5 mils of alcohol.

Obtained from the bark of several species of cinchona, especially from the mother-liquor of quinine sulphate.

Action and use similar to cinchonidine sulphate.

Tonic, antiperiodic. Dose, 150 mg.

COCAINA—Cocaine—**Cocain.**

An alkaloid, methyl-benzoyl-ecgonine, $C_8H_{13}(C_6H_5CO)ON.$-$COOCH_3$ (303.18). The average yield from coca leaves is 0.5 to 1 per cent.

Preserve in well-closed containers, protected from light. Melts between 96° and 98° C.

Colorless, large, four-sided or six-sided monoclinic prisms, or a white crystalline powder; odorless; bitter taste, producing numbness.

Strongly alkaline to litmus. Soluble in about 600 mils of water and in 6.5 mils of alcohol.

Obtained from coca leaves and also synthetically from ecgonine.

Sedative, local anesthetic. Dose, 15 mg.

COCAINÆ HYDROCHLORIDUM—Cocaine Hydrochloride—Cocain. Hydrochl.—*Cocaine Chloride*

The hydrochloride, $C_{17}H_{21}O_4N.HCl$ (339.65), of the alkaloid cocaine.

Permanent in the air. Tends to decompose in the presence of moisture and light. Preserve in well-stoppered bottles, protected from light. Melts between 183° and 191° C.

Colorless, transparent, monoclinic prisms; flaky, lustrous leaflets, or white crystalline powder; odorless; bitter taste followed by a numbness of the tongue.

Neutral to litmus. Soluble in 0.4 mil of water and in 3.2 mils of alcohol.

Obtained from cocaine by the action of hydrochloric acid in alcoholic solution.

Sedative, local anesthetic. Dose, 15 mg.

CODEINA—Codeine—Codein.—*Methylmorphine*

An alkaloid, $C_{17}H_{18}(CH_3)O_3N + H_2O$ (317.19). The average yield from opium is 0.1 to 1 per cent.

Slightly efflorescent in warm air. Preserve in well-closed containers, protected from light.

Colorless, translucent, rhombic prisms, or a crystalline powder; odorless; bitter taste.

Alkaline to litmus. Soluble in 120 mils of water and in 2 mils of alcohol.

Obtained from opium or prepared from morphine by methylation.

Used in cough mixtures as a substitute for morphine, being less narcotic.

Sedative and hypnotic. Dose, 30 mg.

CODEINÆ PHOSPHAS—Codeine Phosphate—Codein. Phos.

The phosphate, $(C_{17}H_{18}(CH_3)O_3N).H_3PO_4 + 2H_2O$ (433.27), of the alkaloid codeine.

Very efflorescent. Preserve in well-closed containers, protected from light.

White, fine, needle-shaped crystals, or crystalline powder; odorless; bitter taste.

Acid to litmus. Soluble in 2.3 mils of water and in 325 mils of alcohol.

Obtained by adding codeine to dilute phosphoric acid and precipitating the salt by the addition of sufficient alcohol.

Same as codeine (sedative, hypnotic). Dose, 30 mg.

CODEINÆ. SULPHAS—Codeine Sulphate—**Codein. Sulph.**

The sulphate, $(C_{17}H_{18}(CH_3)O_3N)_2.H_2SO_4 + 5H_2O$ (786.52), of the alkaloid codeine.

Efflorescent. Preserve in well-closed containers, protected from light.

White, long, glistening, needle-shaped crystals or rhombic prisms, or crystalline powder; odorless; bitter taste.

Neutral or faintly acid to litmus. Soluble in 30 mils of water and in 1280 mils of alcohol.

Obtained by neutralizing an aqueous solution of codeine with sulphuric acid and crystallizing.

Preferred to codeine on account of its greater solubility in water.

Same as codeine (sedative, hypnotic). Dose, 30 mg.

COLCHICINA—Colchicine—**Colchicin.**

An alkaloid, $C_{15}H_9(OCH_3)_3NHCOCH_3COOCH_3$ (399.21). The average yield from the corm is 0.5 to 0.75 per cent.; from the seed, 0.5 to 1 per cent.

Darkens on exposure to light. Preserve in well-closed containers, protected from light.

Pale yellow amorphous scales, or powder; odorless or nearly so; bitter taste. Caution: Poisonous.

Neutral to litmus. Soluble in 22 mils of water, freely soluble in alcohol.

Obtained from colchicum seed.

Irritant, diuretic, antirheumatic. Dose, 0.5 mg.

COTARNINÆ HYDROCHLORIDUM (IX)—Cotarnine Hydrochloride—**Cotarn. Hydrochl.**—*Cotarnine Chloride; Stypticin*

Quartenary oxymethyl - oxymethylene - dihydro - isoquinolene chloride, $(CH_3O)(CH_2O_2).C_9H_6N(CH_3)Cl$ (255.58).

Deliquescent in moist air.

Yellow, crystalline powder; odorless; bitter taste.

Neutral to litmus. Very soluble in water and alcohol.

Obtained by dissolving cotarnine in hydrochloric acid and crystallizing. Cotarnine is obtained from narcotine by hydrolysis, accomplished by boiling it with water. The side product is meconin. Also by oxidizing narcotine with manganese dioxide and sulphuric acid or with diluted nitric acid. The side product in this case is opianic acid.

Styptic, internally and externally. Dose, 60 mg.

COUMARINUM, N. F.—Coumarin—**Coumar.**

The lactone, ($C_6H_4(CH)_2OCO$ (146.05), of ortho-oxycinnamic acid, occurring naturally in Tonka, Melilot, and other plants, or prepared synthetically.

Volatile; m. p., 67° to 68° C. Preserve in well-stoppered, amber-colored bottles.

Colorless, prismatic crystals; characteristic, fragrant odor; bitter, aromatic, and burning taste.

Sparingly soluble in cold water; freely soluble in alcohol.

Obtained synthetically by boiling together for several hours under a reflux condenser 3 parts salicylic aldehyde; 5 parts acetic anhydride, and 4 parts anhydrous sodium acetate; cooling, and adding water to the crystalline mass. The oily liquid which separates is distilled and the coumarine obtained is dissolved in hot water and crystallized.

Used as a flavoring agent and perfume.

CREOSOTI CARBONAS (IX)—Creosote Carbonate—**Creosot. Carb.**—*Creosotal*

A mixture of the carbonates of the various constituents of creosote, chiefly guaiacol and creosol.

Long exposure at low temperatures causes the guaiacol carbonate, $(C_6H_4(OCH_3)O)_2.CO$, to separate. It redissolves on warming.

Colorless or yellowish, clear, viscid liquid; sp. gv., 1.145 to 1.170; odorless; or having a slight odor and taste of creosote.

Neutral to litmus. Insoluble in water; freely soluble in alcohol.

Obtained by the action of phosgene gas on a solution of creosote in sodium hydroxide.

$$\underset{\text{Guaiacol.}}{2C_6H_4(OCH_3)OH} + \underset{\text{Phosgene.}}{COCl_2} + \underset{\text{Sodium hydroxide.}}{2NaOH} = \underset{\text{Guaiacol carbonate.}}{(C_6H_4(OCH_3)O_2CO} + \underset{\text{Sodium chloride.}}{2NaCl} + \underset{\text{Water.}}{2H_2O}$$

$$\underset{\text{Creosol.}}{2C_6H_3(CH_3)(OCH_3)(OH)} + \underset{\text{Phosgene.}}{COCl_2} + \underset{\text{Sodium hydroxide.}}{2NaOH} = \underset{\text{Creosol carbonate.}}{(C_6H_3CH_3OCH_3O)_2CO} + \underset{\text{Sodium chloride.}}{2NaCl} + \underset{\text{Water.}}{H_2O}$$

Used as a substitute for creosote, being less irritating.

Antiseptic. Dose, 1 gm.

CREOSOTUM — Creosote — **Creosot.** — *Creasote; Beech Wood Creosote*

A mixture of phenols and phenol derivatives, chiefly guaiacol ($C_6H_4.OCH_3.OH$), creosol ($C_6H_3.CH_3.OCH_3.OH$), and cresol ($C_6H_4.CH_3.OH$).

Turns brown slowly upon exposure to light. Preserve in tightly stoppered, dark amber-colored bottles.

Almost colorless or yellowish, highly refractive, oily liquid; sp. gv., not below 1.073; penetrating, smoky odor; burning, caustic taste.

Neutral or faintly acid to litmus. Slightly soluble in water, miscible with alcohol.

Obtained from wood tar by a series of fractional distillations.

Antiseptic. Dose, 0.25 mil.

CRESOL—Cresol

A mixture of isomeric cresols, $C_6H_4.CH_3.OH$ (108.06).

Darkens and assumes a reddish tint with age and exposure to light. Preserve in well-closed containers, protected from light.

Colorless, yellowish to brownish-yellow, highly refractive liquid; sp. gv., 1.030 to 1.038; phenol-like odor; burning, caustic taste.

Neutral or slightly acid to litmus. Soluble in about 60 mils of water, usually forming a cloudy liquid. Miscible with alcohol.

Obtained by fractionating and purifying the phenol distillates of coal-tar.

Used in preparing several antiseptic preparations. An ingredient in compound solution of cresol, 50 per cent.

Antiseptic. Dose, 0.05 mil.

DEXTRINUM ALBUM, N. F.—White Dextrin—Dext. Alb.

A mixture of soluble carbohydrates, amylodextrin, achroödextrin, erythrodextrin, and maltodextrin together with a variable amount of unconverted starch.

Permanent in the air.

White, glistening, amorphous powder producing a peculiar and characteristically harsh sensation when rubbed in the hand; odorless; sweetish taste.

Only partially soluble in cold water; completely soluble in 3 parts of water on boiling; insoluble in alcohol.

Obtained by the incomplete hydrolysis of starch; usually 1000 parts of potato starch is moistened with a solution of 2 parts of 58 per cent. nitric acid in 300 parts of water, and the resulting mass dried at a temperature of 110° to 120° C. until it ceases to give the starch reaction with iodine.

Dextrin has many commercial uses. Under the name of British gum it is used as an adhesive agent; when properly purified it is used in the preparation of infants' food.

Used in preparing dextrinated paste, N. F., 33 per cent.

May be administered internally as a demulcent in the form of a mucilage.

DIACETYLMORPHINA (IX) — Diacetylmorphine — Diacetylmorph.— *Heroine*

An artificial alkaloid, $C_{17}H_{17}(O.C_2H_3O)_2ON$ (369.19).

Preserve in well-closed containers, protected from light.

White crystalline powder; odorless; bitter taste.

Alkaline to litmus. Soluble in 1700 mils of water and in 31 mils of alcohol.

Obtained by heating pure morphine with acetylchloride (CH_3COCl), washing the product with dilute sodium carbonate solution, and finally crystallizing it from hot alcohol.

Used in cough mixtures, etc.

Sedative. Dose, 3 mg.

DIACETYLMORPHINÆ HYDROCHLORIDUM (IX)—Diacetylmorphine Hydrochloride—**Diacetylmorph. Hydrochl.**—*Diacetylmorphine Chloride; Heroine Hydrochloride*

The hydrochloride of the artificial alkaloid, diacetylmorphine.

Preserve in well-closed containers, protected from light.

White, crystalline powder; odorless; bitter taste.

Neutral or slightly acid to litmus. Soluble in 2 mils of water; soluble in alcohol.

Obtained from diacetylmorphine by dissolving it in dilute hydrochloric acid, concentrating, and crystallizing.

Used similarly to diacetylmorphine, but is more soluble in water.

Sedative. Dose, 3 mg.

DIASTASUM (IX)—Diastase

A mixture containing amylolytic enzymes capable of converting not less than 50 times its weight of potato starch into sugars, chiefly dextrose and maltose.

Preserve in well-closed containers protected from light, heat, and moisture. Its amylolytic powers gradually decrease with age, are diminished by the presence of acids and alkalies, and are destroyed in solutions heated to 85° C. or when rendered strongly acid.

Yellowish-white, amorphous powder or translucent scales; odorless; tasteless.

Soluble in water, the solutions being more or less turbid; insoluble in alcohol.

Obtained by precipitating an infusion of malt, prepared at a temperature not above 60° C., with alcohol, and purified by reprecipitation.

Takadiastase, the name of a proprietary form of diastase, is obtained from the roots of a species of *aspergillus* grown upon sterilized bran or rice hulls.

Used in amylaceous dyspepsia. Dose, 0.5 gm.

ELATERINUM—Elaterin—**Elaterin.**

A neutral principle.

Permanent in the air.

White, minute hexagonal scales or prismatic crystals; odorless; slightly acrid, bitter taste.

Neutral to litmus. Insoluble in water. Soluble in 325 mils of alcohol.

Obtained from elaterium, a substance deposited from the juice of the squirting or wild cucumber. Elaterium is extracted with boiling alcohol, the elaterin precipitated with water, washed with ether, and finally recrystallized from absolute alcohol. Yield about 30 per cent.

An ingredient in trituration of elaterin, 10 per cent.

Hydragogue, cathartic. Dose, 3 mg.

EMETINÆ HYDROCHLORIDUM (IX)—Emetine Hydrochloride—**Emet. Hydrochl.**

The hydrochloride, $C_{30}H_{44}O_4N_2.2HCl$ (569.31), of the alkaloid emetine, with variable amounts of water of crystallization. The average yield of emetine from Rio ipecac is 1.5 to 2.5 per cent.; from Carthagena ipecac about 1 per cent.

Gradually darkens upon exposure to light. Preserve in dark, amber-colored vials, protected from light.

White or very slightly yellowish, crystalline powder; odorless; bitter taste.

Slightly acid to litmus. Freely soluble in water and alcohol.

Obtained from emetine, an alkaloid obtained from ipecac, by dissolving in diluted hydrochloric acid and crystallizing.

A distinctive agent against various forms of amœbæ, notably those of dysentery.

Expectorant, emetic. Dose, hypodermic, 20 mg.

EUCALYPTOL—Eucalyptol—*Cineol; Cajuputol*

An organic, optically inactive liquid, $C_{10}H_{18}O$ (154.14), having the character of an inner oxide.

Volatile. Preserve in well-closed containers in a cool place, protected from light. Boils between 174° and 177° C.

A colorless liquid; sp. gv., 0.921 to 0.923; aromatic, camphoraceous odor; pungent, spicy taste; produces a cooling sensation in the mouth.

Very slightly soluble in water. Miscible with alcohol.

Prepared from the volatile oil obtained from eucalyptus, cajuput, and other sources by fractional distillation and subsequent chilling.

Stimulant, expectorant, antiseptic. Dose, 0.3 mil.

EUGENOL—Eugenol

An unsaturated, aromatic phenol allyl guaiacol, $C_6H_3.C_3H_5$-$OCH_3.OH$ (164.10).

Darkens and thickens upon exposure to air. Preserve in well-closed containers in a cool place, protected from light. Boils between 250° and 255° C.

Colorless or pale yellow, thin liquid; sp. gv., 1.064 to 1.070; strongly aromatic odor of clove; pungent, spicy taste.

Slightly acid to litmus. Very sparingly soluble in water. Miscible with alcohol.

Obtained mainly from oil of clove, but also from other sources. The oil of clove is shaken with 10 per cent. sodium hydroxide solution; the sodium eugenol ($C_6H_3.C_3H_5.OCH_3.ONa$) separated; decomposed with diluted sulphuric acid; freed from acid by washing with solution of sodium carbonate, and finally distilled with steam or *in vacuo*.

Substitute for oil of clove.

Antiseptic, local anesthetic. Dose, 0.2 mil.

FEL BOVIS—Oxgall

Fresh oxgall, a very complex liquid, containing glycocholates, taurocholates, mineral salts, phosphates, chlorides, coloring-matter, etc.

Brownish-green or dark green, somewhat viscid liquid; sp. gv., 1.015 to 1.025; characteristic odor; disagreeable bitter taste.

Neutral or faintly alkaline to litmus. Soluble in water; partially soluble in alcohol.

Obtained from the gall-bladder of the recently killed ox.

Used as a source for the production of the powdered extract of oxgall, 800 per cent.

Tonic, laxative. Usually administered in the form of powdered extract of oxgall. Dose, 100 mg. of extract.

GELATINUM—Gelatin—**Gelat.**

A complex organic substance consisting principally of glutin.

Decomposes (molds) when moist or in solution. Permanent when dry.

Colorless or slightly yellowish, amorphous solid, in sheets or flakes, or powdered, ground, or shredded; slight, characteristic odor and taste.

Slightly acid to litmus. Insoluble in cold water, but swells and softens when immersed in it, gradually absorbing five to ten times its weight of it. Soluble in hot water and in acetic acid. Insoluble in alcohol.

Obtained from animal tissues, skin, ligaments, and bones by extracting them with boiling water, cooling, skimming and clarifying, then finally cut into sheets and spread on netting to dry. Inferior grades of gelatin are known as glue.

It is used in making lamellæ, gelatin capsules, coating of pills, as a suppository base in the form of the official glycerinated gelatin, etc.

Has no direct medicinal value.

GELATINUM GLYCERINATUM — Glycerinated Gelatin— **Gelat. Glycerin.**

Preserve in well-closed containers.

Yellowish-white, jelly-like mass.

Prepared by soaking 100 gm. of gelatin in cold sterilized water for one hour; pouring off the excess water; heating to solution on a water-bath with 100 gm. of glycerin, and continuing the heating until the weight has been reduced to 200 gm.

Used as a suppository base and vehicle for other drugs.

GLUCOSUM (IX)—Glucose—**Glucos.**—*Syrupy Glucose; Liquid Glucose; Jelly Glucose; Confectioners' Glucose*

Chiefly dextrose (d-glucose), $C_6H_{12}O_6$ (180.10), and dextrins.

Colorless or slightly colored, thick, syrupy liquid; odorless or nearly so; sweet taste.

Neutral or slightly acid to litmus. Very soluble in water and *sparingly* soluble in alcohol.

Obtained from starch through hydrolysis by boiling it with dilute sulphuric acid, neutralizing the acid with chalk, clarifying and decolorizing by means of clay and animal charcoal, and concentrating in a vacuum pan, filtering out any precipitated calcium sulphate, to a density of 40° to 44° Baumé (sp. gv., 1.38 to 1.43).

Used as a vehicle and sweetening agent. About equal to cane-sugar in food value, but not in sweetness. Used extensively in confectionery and as a base for table syrups.

Officially used as a diluent in pilular extract of belladonna leaves, extract of hyoscyamus, and extract of stramonium.

Dose. None given in the U. S. P.

GLYCERINUM—Glycerin—**Glycerin.**—*Glycerol*

A trihydric alcohol, $CH_2OH.CHOH.CH_2OH$ (92.06).

Hygroscopic. Preserve in well-closed containers.

Colorless, clear, thick liquid; sp. gv., not below 1.249; slight, characteristic odor; sweet taste, producing a sensation of warmth in the mouth.

Neutral to litmus. Miscible with water and alcohol.

Obtained as a by-product in the soap industry from the fats and oils by saponification or hydrolysis. See Acidum Oleicum and Stearicum. Purified by steam distillation under pressure.

A very important agent in the production of explosives, such as nitroglycerin.

In pharmacy used as a solvent and preservative. See *Glycerites*, page 328.

Mild laxative. Dose, 4 mils.

Synopsis of U. S. P. Substances that Contain Glycerin

Calcium Glycerophosphate	Radical
Fluidextract of Aspidosperma	11 m/m.
Fluidextract of Cascara Sagrada, Aromatic	20 m/m.
Fluidextract of Cinchona	10 m/m.
Fluidextract of Hydrastis	10 m/m.
Fluidextract of Pomegranate	10 m/m.
Fluidextract of Rose	10 m/m.
Honey of Rose	12 m/g.
Fluidextract of Sarsaparilla, Compound	10 m/m.
Fluidextract of Taraxacum	10 m/m.
Fluidextract of Uva Ursi	10 m/m.

Glycerinated Gelatin	50 per cent.
Glycerite of Boroglycerin	96 per cent.
Glycerite of Hydrastis	50 m/m.
Glycerite of Phenol	80 m/m.
Glycerite of Starch	80 per cent.
Glycerite of Tannic Acid	80 per cent.
Solution of Iron and Ammonium Acetate	12 m/m.
Solution of Sodium Glycerophosphate	Radical.
Mass of Mercury	9 per cent.
Clarified Honey	About 5 per cent.
Mercury with Chalk	10 per cent.
Honey of Rose (about)	88 per cent.
Mass of Mercury	32 per cent.
Mass of Ferrous Carbonate	38 per cent.
Mucilage of Tragacanth	18 per cent.
Troches of Sodium Bicarbonate	Excipient.
Pills of Ferrous Carbonate	Excipient.
Pills of Phosphorus	Excipient.
Sodium Glycerophosphate	Radical.
Solution of Sodium Glycerophosphate	Radical.
Suppositories of Glycerin	300 g/n.
Spirit of Glyceryl Trinitrate	Radical.
Syrup of Calcium Lactophosphate	5 m/m.
Syrup of Hypophosphites	5 m/m.
Syrup of Ipecac	10 m/m.
Syrup of Lactucarium	20 m/m. + Tr.
Syrup of Rhubarb, Aromatic	15 m/m. of Tr.
Syrup of Wild Cherry	5 m/m.
Tincture of Cardamom, Compound	5 m/m.
Tincture of Cinchona	7.5 m/m.
Tincture of Cinchona, Compound	7.5 m/m.
Tincture of Cinnamon	7.5 m/m.
Tincture of Gentian, Compound	10 m/m.
Tincture of Lactucarium	25 m/m.
Syrup of Lactucarium	10 m/m.
Tincture of Opium, Camphorated	4 m/m.
Compound Mixture of Glycyrrhiza	12 m/m.
Tincture of Rhubarb	10 m/m.
Tincture of Rhubarb, Aromatic	10 m/m.
Aromatic Syrup of Rhubarb	15 m/m.
Ointment of Tannic Acid	20 per cent.
Iodine Ointment	12 per cent.
Vaccine Virus	Solvent.

GLYCYRRHIZINUM AMMONIATUM—Ammoniated Glycyrrhizin—**Glycyrrh. Ammon.**

A sweet principle, combined with ammonia, consisting chiefly of ammonium glycyrrhizinate, $(NH_4)C_{44}H_{62}O_{18}N$.

Absorbs moisture from the air. Preserve in well-closed containers.

Dark brown or brownish-red scales; odorless; very sweet taste.

Slightly alkaline in reaction. Freely soluble in water and alcohol.

Obtained from licorice by extracting it with diluted ammonia-water, precipitating the extract with sulphuric acid, dissolving the precipitate in ammonia-water, and scaling.

Used as a substitute for other licorice preparations.

Mild laxative. Dose, 250 mg.

GUAIACOL—Guaiacol

The monomethyl ether, $C_6H_4(OH)OCH_3$ (124.06), of ortho-di-hydroxybenzene.

Darkens upon exposure to light and air. Preserve in well-closed containers, protected from light.

Colorless or yellowish, strongly refractive liquid; sp. gv., 1.110 to 1.114; or a colorless or yellowish crystalline solid; agreeable, aromatic odor; burning, caustic taste.

Soluble in 53 mils of water, in 0.8 of glycerin; miscible with alcohol.

Obtained from wood-tar creosote by fractional distillation and purified by precipitation from its ether solution with potassium hydroxide. The guaiacol is liberated from the potassium guaiacolate by sulphuric acid and redistilled. Also obtained synthetically by heating to 170° and 180° C. in a closed vessel

$$\underset{\text{Pyrocatechin.}}{C_6H_4(OH)_2} + \underset{\text{Potassium hydroxide.}}{KOH} + \underset{\text{Potassium methyl sulphate.}}{KCH_3SO_4} =$$

$$\underset{\text{Guaiacol.}}{C_6H_4OH.OCH_3} + \underset{\text{Potassium sulphate.}}{K_2SO_4} + \underset{\text{Water.}}{H_2O}$$

Expectorant, intestinal antiseptic. Dose, 0.5 mil.

GUAIACOLIS CARBONAS—Guaiacol Carbonate—**Guaiacol. Carb.**—*Duotal*

A guaiacol derivative, $(C_6H_4(OCH_3)O)_2.CO$ (274.11).

Melts between 83° and 87° C.

White, crystalline powder; odorless; tasteless, or having a slight aromatic odor and taste.

Insoluble in water; soluble in 60 mils of alcohol.

Obtained by passing phosgene gas into guaiacol, previously dissolved in soda solution, and crystallizing the product.

$$\underset{\text{Sodium guaiacolate.}}{2C_6H_4.OCH_3ONa} + \underset{\text{Phosgene.}}{COCl_2} = \underset{\text{Guaiacol carbonate.}}{(C_6H_4(OCH_3)O)_2CO} + \underset{\text{Sodium chloride.}}{2NaCl}$$

Less liable than guaiacol to derange the stomach.

Expectorant, intestinal antiseptic. Dose, 1 gm.

HEXAMETHYLENAMINA—Hexamethylenamine—**Hexam.**—*Hexamethylene-tetramine; Formamine; Urotropin; Uritone*

A condensation product of ammonia and formaldehyde, $(CH_2)_6N_4$ (140.14).

Preserve in well-closed containers.

Colorless, lustrous crystals or white crystalline powder; odorless; sweetish taste.

Alkaline to litmus. Soluble in 1.5 mils of water and in 12.5 mils of alcohol.

Obtained by mixing together solution of formaldehyde and stronger ammonia-water and crystallizing the product.

$$\underset{\text{Formaldehyde.}}{6HCHO} + \underset{\text{Ammonia.}}{4NH_3} = \underset{\text{Hexamethylenamine.}}{(CH_2)_6N_4} + \underset{\text{Water.}}{6H_2O}$$

Intestinal and genito-urinary antiseptic. Dose, 250 mg.

HOMATROPINÆ HYDROBROMIDUM—Homatropine Hydrobromide—**Homatrop. Hydrobr.**—*Homatropine Bromide*

The hydrobromide, $C_{16}H_{21}O_3N.HBr$ (356.11), of the artificial alkaloid, homatropine.

Preserve in well-closed containers, protected from light.

White, crystalline powder or rhombic prisms; odorless; bitter taste. Caution: Poisonous.

Neutral to litmus. Soluble in 6 mils of water and in 40 mils of alcohol.

Obtained by the action of hydrobromic acid upon homatropine, which is a condensation product of tropine and mandelic acid.

Used as a mydriatic, it works more rapidly than atropine. *When a drop of a* 0.2 per cent. solution is placed in the eye every five minutes for five times paralysis of the accommodation is complete in sixty to ninety minutes and the effect lasts from fifteen to thirty-six hours.

Mydriatic, sedative, similar to atropine, but less poisonous. Dose, 0.5 mg.

HYDRASTINA—Hydrastine

An alkaloid, $C_{21}H_{21}O_6N$ (383.18). The average yield from hydrastis is 2 to 3 per cent.

Permanent in the air. Preserve in well-closed containers, protected from light.

White or creamy white, glistening prisms, or a white microcrystalline powder; odorless; bitter, pungent taste.

Alkaline to litmus. Almost insoluble in water; soluble in 170 mils of alcohol.

Obtained from hydrastis.

Constringent, tonic. Dose, 10 mg. Usually used locally for its effect on mucous membranes.

HYDRASTINÆ HYDROCHLORIDUM (IX)—Hydrastine Hydrochloride—**Hydrastin. Hydrochl.**—*Hydrastine Chloride*

The hydrochloride, $C_{21}H_{21}O_6N.HCl$ (419.65), of the alkaloid hydrastine.

Hygroscopic. Preserve in well-closed containers, protected from light.

White to creamy white powder; odorless; bitter taste.

Neutral or slightly acid to litmus. Very soluble in water and in alcohol.

Obtained by dissolving the powdered hydrastine in the proper quantity of diluted hydrochloric acid and crystallizing.

Action and uses, same as hydrastine. Constringent, tonic. Dose, 10 mg.

HYDRASTININÆ HYDROCHLORIDUM—Hydrastinine Hydrochloride—**Hydrastinin. Hydrochl.**—*Hydrastinine Chloride*

The hydrochloride, $C_{11}H_{11}O_2N.HCl$ (225.57), of the artificial alkaloid, hydrastinine.

Preserve in well-closed containers, protected from light.

Yellowish, light needles, or yellowish-white, crystalline powder; odorless; bitter taste.

Neutral to litmus. Very soluble in water and alcohol.

Obtained by dissolving hydrastinine in concentrated hydrochloric acid and crystallizing from alcohol. Hydrastinin is obtained from hydrastin by oxidation with nitric acid.

$$\underset{\text{Hydrastine.}}{C_{21}H_{21}O_6N} + \underset{\text{Oxygen.}}{O} = \underset{\text{Hydrastinine.}}{C_{11}H_{11}O_2N} + \underset{\text{Opianic acid.}}{C_{10}H_{10}O_5}$$

The aqueous solution is fluorescent, similar to quinine sulphate solutions.

Styptic, uterine astringent. Dose, 30 mg.

HYOSCYAMINÆ HYDROBROMIDUM—Hyoscyamine Hydrobromide—**Hyoscyamin. Hydrobr.**—*Hyoscyamine Bromide*

The hydrobromide, $C_{17}H_{23}O_3N.HBr$ (370.12), of the alkaloid hyoscyamine. The average yield of hyoscyamine from hyoscyamus leaves is 0.05 to 0.125 per cent.

Deliquescent. Preserve in well-closed containers, protected from light.

White, prismatic crystals; odorless; bitter taste. Caution: Poisonous.

Neutral to litmus. Very soluble in water; soluble in 2.5 mils of alcohol.

Obtained from hyoscyamine, the alkaloid of hyoscyamus and other solanaceous plants, by dissolving it in hydrobromic acid and crystallizing.

Narcotic, mydriatic. Dose, 0.3 mg.

IODOFORMUM—Iodoform—**Iodof.**

Triiodomethane, CHI_3 (393.77).

Volatile. Preserve in well-closed containers, in a cool place, protected from light.

Lemon-yellow, fine powder or lustrous crystals of the hexagonal system; peculiar, penetrating, persistent odor; unpleasant, slightly sweetish taste, suggestive of iodine.

Neutral to litmus. Nearly insoluble in water; soluble in 60 mils of alcohol.

Obtained from alcohol or acetone and iodine by reactions analogous to those for the production of chloroform.

An ingredient in ointment of iodoform, 10 per cent.

Antiseptic, sedative. Dose, 250 mg.

MENTHOL—Menthol

A secondary alcohol, $C_{10}H_{19}OH$ (156.16).

Volatile. Preserve in well-closed containers, in a cool place. Melts between 42° and 44° C.

Colorless, acicular or prismatic crystals; strong odor, and taste of peppermint; produces a sensation of warmth followed by cold when air is drawn into the mouth.

Neutral to litmus. Slightly soluble in water; very soluble in alcohol.

Obtained from oil of peppermint by chilling and draining off the liquid portion.

Anodyne, antiseptic. Dose, 60 mg.

METHYLIS SALICYLAS—Methyl Salicylate—**Methyl. Salicyl.** —*Oil of Wintergreen, Oleum Gaultheriæ,* U. S. P. VIII; *Oil of Sweet Birch, Oleum Betulæ,* U. S. P. VIII; *Oil of Teaberry*

Methyl salicylate, $C_6H_4OHCOOCH_3$ (152.06). The label must indicate the source of the product.

Volatile. Preserve in well-stoppered, amber-colored bottles, in a cool place, protected from light.

Colorless, yellowish or reddish liquid; sp. gv., synthetic, 1.180 to 1.185; from natural sources, 1.172 to 1.182; characteristic odor and taste of wintergreen.

Slightly acid to litmus. Sparingly soluble in water; miscible with alcohol.

Obtained by heating together salicylic acid and methyl alcohol in the presence of a dehydrating agent (sulphuric acid) and rectifying.

$$\underset{\text{Salicylic acid.}}{C_6H_4OHCOOH} + \underset{\text{Methyl alcohol.}}{CH_3OH} = \underset{\text{Methyl salicylate.}}{C_6H_4OHCOOCH_3} + \underset{\text{Water.}}{H_2O}$$

Also obtained by steam distillation from wintergreen and from the bark of the sweet birch.

Antiseptic, analgesic, carminative, flavoring agent.

Dose, 0.75 mil.

METHYLTHIONINÆ CHLORIDUM—Methylthionine Chloride—**Methylthionin. Chlor.**—*Methylthioninæ Hydrochloridum*, U. S. P. VIII; *Methylene Blue*

Tetramethylthionine chloride, $C_{16}H_{18}N_3ClS + 3H_2O$ (373.75).

Dark green, crystalline powder, or prismatic crystals having a luster resembling bronze, but deep blue color in solution; odorless; nearly tasteless.

Freely soluble in water and alcohol.

Obtained by treating para-amido-dimethyl aniline (C_6H_4-$NH_2N(CH_3)_2$) in hydrochloric acid solution with hydrogen sulphide and subsequently with ferric chloride.

The commercial dye, methylene-blue, contains zinc compounds and is unfit for medicinal use. Stains from it may be removed with solution of chlorinated soda.

It is usually prescribed in capsules or pills.

Urinary antiseptic. Dose, 150 mg.

MORPHINA—Morphine

An alkaloid, $C_{17}H_{17}OH.NO.OH + H_2O$ (303.18). The average yield from dry opium is 3 to 20 per cent. of crystallized morphine.

Permanent in the air. Preserve in well-closed containers, protected from light.

Colorless or white, shining, rhombic prisms, fine needles, or crystalline powder; odorless; bitter taste.

Alkaline to litmus. Soluble in 3340 mils of water and in 210 mils of alcohol.

Obtained from opium. It was the first alkaloid known. Sertürner in 1816 established its identity.

Narcotic, sedative, (habit-forming drug). Dose, 8 mg.

MORPHINÆ HYDROCHLORIDUM—Morphine Hydrochloride—**Morph. Hydrochl.**—*Morphine Chloride*

The hydrochloride, $C_{17}H_{17}(OH)NO.OH.HCl + 3H_2O$ (375.68), of morphine.

Permanent in the air. Preserve in well-closed containers, protected from light.

White, silky, glistening needles or cubical masses, or white crystalline powder; odorless; bitter taste.

Neutral or slightly acid to litmus. Soluble in 17.5 mils of water and in 52 mils of alcohol.

Obtained by carefully neutralizing morphine, diffused in boiling distilled water, with diluted hydrochloric acid and crystallizing.

Narcotic, sedative. Dose, 8 mg.

MORPHINÆ SULPHAS—Morphine Sulphate—**Morph. Sulph.**

The sulphate, $(C_{17}H_{17}(OH)NO.OH)_2H_2SO_4 + 5H_2O$ (758.49), of morphine.

Permanent in air. Preserve in well-closed containers, protected from light.

Neutral or slightly acid to litmus. Soluble in 15.5 mils of water and in 565 mils of alcohol.

Obtained by neutralizing morphine, diffused in boiling distilled water, with diluted sulphuric acid and crystallizing.

Narcotic, sedative. Dose, 8 mg.

PANCREATINUM—Pancreatin—**Pancreat.**

Consists principally of the enzymes, amylopsin (pancreatic diastase, amylolytic enzyme), trypsin (proteolytic enzyme), steapsin (fat emulsifying enzyme), and is capable of converting not less than twenty-five times its own weight of starch into soluble carbohydrates when assayed by the U. S. P. method. Acts in alkaline media.

Keep dry. Preserve in well-closed containers.

Cream colored, amorphous powder; faint characteristic, but not offensive odor; somewhat meat-like taste.

Obtained from the fresh pancreas (sweet breads) of the hog and ox. The cleansed pancreas are minced, mixed with a small quantity of chloroform-water, and thoroughly kneaded, then expressed, and the liquid filtered. Alcohol is then added to the clear liquid, the precipitate thus formed is removed by straining and pressure, and then spread on shallow trays and dried in a current of warm air, and finally powdered.

Digestant. Dose, 0.5 gm.

PARAFFINUM—Paraffin—**Paraff.**

A mixture of hydrocarbons ranging principally between $C_{24}H_{50}$ and $C_{27}H_{56}$.

Preserve in a cool place. Melts between 50° and 57° C.

Colorless or white, more or less translucent mass, crystalline when separating from solution; sp. gv., about 0.900; odorless; tasteless; slightly greasy to the touch.

Insoluble in water and alcohol. Freely soluble in ether, benzin, benzene, and carbon disulphide.

Obtained in the fractionating of crude petroleum. Separated from the higher boiling fractions by chilling.

Used in making candles, waxed paper, floor polishes, etc.

Has no therapeutic properties. Used similarly to spermaceti, in cold creams, etc.

PARAFORMALDEHYDUM (IX) — Paraformaldehyde — **Paraform.**—*Paraform; Trioxymethylene*

Polymeric form of formaldehyde containing not less than 95 per cent. of $(HCHO)_3$ (90.05).

Slowly volatile. Preserve in well-closed containers, in a cool place, protected from light.

White friable masses or powder, slight odor of formaldehyde; tasteless, slightly pungent after-taste. On heating it is partly converted into formaldehyde and partly sublimed unchanged.

Neutral to litmus. Slowly soluble in water; insoluble in alcohol.

Obtained by heating solution of formaldehyde, part of the formaldehyde volatilizes and part of it polymerizes and solidifies.

When heated with water vapor it is used to disinfect clothes, rooms, etc. It is the active component of formaldehyde candles, etc.

Disinfectant, intestinal antiseptic. Dose, 0.5 gm.

PARALDEHYDUM—Paraldehyde—**Paraldehyd.**

A polymer, $(CH_3CHO)_3$ (132.10), of acetaldehyde.

Volatile. Preserve in well-closed containers, in a cool place, protected from light. Boils between 120° and 125° C.

Colorless, transparent liquid; sp. gv., about 0.990; strong, characteristic, but not unpleasant or pungent odor; produces first a burning and then a cooling sensation in the mouth.

Neutral or only slightly acid to litmus. Soluble in 8 mils of water; miscible with alcohol.

Obtained usually by conducting gaseous hydrochloric acid into aldehyde until the liquid is no longer soluble in an equal volume of water. The crude product thus obtained is cooled to 0° C. and the crystalline mass thus obtained is distilled. The chilling and distilling is repeated until a boiling-point of 124° C. is obtained for the product.

Hypnotic. Dose, 2 mils.

PELLETIERINÆ TANNAS — Pelletierine Tannate — **Pellet. Tann.**

A mixture in varying proportions of the four alkaloids, punicine, iso-punicine, methyl-punicine, and pseudo-punicine. The average yield of pelletierine from pomegranate bark is 0.1 to 0.5 per cent.

Preserve in small, well-closed containers, protected from light.

Light yellow, amorphous powder; odorless; astringent taste.

Slightly acid to litmus. Soluble in 240 mils of water and in 16 mils of alcohol.

The four alkaloids are obtained from the bark of the pomegranate. The finely ground bark is mixed with milk of lime and extracted with water. The aqueous extract is shaken out with chloroform; the chloroform is shaken out with very dilute sulphuric acid and the sparingly soluble tannates precipitated by the addition of solution of tannic acid.

Teniacide. Dose, 250 mg.

PEPSINUM—Pepsin—**Pepsin.**

A mixture containing a proteolytic enzyme capable of digesting not less than 3000 times its own weight of freshly coagulated and disintegrated egg-albumen.

Slightly hygroscopic. Preserve in well-closed containers.

White, pale yellow, or yellowish, lustrous, transparent or translucent scales, grains, or spongy masses, or a white or cream colored, fine, amorphous powder; free from offensive odor; slightly acid or a saline taste.

Acid to litmus. Soluble in about 50 parts of water, forming a more or less opalescent solution; nearly insoluble in alcohol.

Obtained from the mucous lining of the stomach of the hog. The well-cleansed and minced mucous membranes are brought into solution by digestion with acidulated water; preservative added (sulphurous acid), and the liquid clarified; the pepsin precipitated by the addition of sodium sulphate; then redissolved in hydrochloric acid and the salts removed by dialysis. The solution thus purified is concentrated at a low temperature and spread on glass plates to dry in a current of warm air.

Digestant. Dose, 0.5 gm.

PETROLATUM—Petrolatum—Petrolat.—*Petrolatum Ointment; Petroleum Jelly; Cosmoline; Saxoline*

A mixture of hydrocarbons, chiefly of the methane series.

Permanent in the air. Melts between 38° and 54° C.

Yellowish to light-amber colored, unctuous mass, transparent in thin layers, completely amorphous, having not more than a slight fluorescence even after being melted; sp. gv., 0.820 to 0.865; odorless or nearly so; bland, nearly tasteless.

Neutral to litmus. Insoluble in water; almost insoluble in alcohol.

Obtained from the residue left after the distillation of crude petroleum, purifying it by repeated treatments with sulphuric acid, sodium hydroxide, and animal charcoal.

Used in the arts as a lubricant and in pharmacy as an emollient and ointment base.

An ingredient in diluted mercurial ointment, 40 per cent.; ointment of yellow mercuric oxide, 40 per cent.; emulsion of petrolatum, N. F., 22.5 g/m.

Emollient. Rarely used internally.

PETROLATUM ALBUM—White Petrolatum—**Petrolat. Alb.**—*White Petroleum Jelly; Albolene*

Petrolatum wholly or nearly decolorized.

White or faintly yellowish; in other respects similar to petrolatum.

It is prepared in a manner similar to that for the production of petrolatum, except that greater care is used to obtain a colorless product.

Used in the preparation of white ointments and ointment bases. In some cases it is used as a substitute for lard, but it is less readily absorbed.

An ingredient in ointment of boric acid, 85 per cent.; diachylon ointment, 49 per cent.; ointment of ammoniated mercury, 50 per cent.

Emollient. Rarely used internally.

PETROLATUM LIQUIDUM—Liquid Petrolatum—**Petrolat. Liq.**—*Liquid Paraffin; Mineral Oil; Hydrocarbon Oil; Petronol; Nujol; Stanolax; Stanolind; Liquid Albolene*

A mixture of liquid hydrocarbons of the methane series.

Preserve in well-closed containers, protected from light. Official as heavy liquid petrolatum and as light liquid petrolatum. The difference is not one of *density* but of viscosity, the figure for the former being not less than 3.1 and for the latter not more than 3.

Colorless, transparent oily liquid, free or nearly so from fluorescence; sp. gv., 0.828 to 0.905; odorless when cold, and not more than a faint petroleum odor when heated; tasteless.

Insoluble in water and alcohol. Soluble in ether, chloroform, and fixed and volatile oils.

Obtained from the fraction of crude petroleum distilling between 330° and 360° C. This fraction is treated alternately with sulphuric acid and caustic soda; decolorized by filtering hot through animal charcoal, fuller's earth, etc.; chilled to remove paraffin, and again distilled, collecting the fraction distilling above 330° C.

Used as a lubricating oil and as a substitute for almond oil, etc., as an emollient, and in cold creams, etc.

Emollient, laxative. Dose, 15 mils.

PHENOL—Phenol—*Carbolic Acid*

Hydroxybenzene, containing not less than 97 per cent. of C_6H_5OH (94.09).

Acquires a red tint upon exposure to light. Preserve in well-closed containers, protected from light.

Colorless, interlaced or separate needle-shaped crystals, or white crystalline mass; characteristic, somewhat aromatic odor. When undiluted cauterizes and whitens the skin; caustic; sweetish taste when diluted.

Neutral or slightly acid to litmus. Soluble in 15 mils of water; very soluble in alcohol and glycerin. It is liquefied by the addition of about 8 per cent. of water.

Obtained from coal-tar by fractional distillation and purification. The fraction known as *light oil* (100° to 250° C.) is agitated with a 10 per cent. solution of sodium hydroxide, whereby the phenol is converted into the soluble sodium phenolate; the solution carefully separated from *insoluble oils;* just the right quantity of acid, HCl or H_2SO_4, is then added to liberate the homologous phenols, which are separated; additional acid is then added to liberate the phenol, which rises to the top of the liquid; after removal it is then washed with concentrated solution of sodium chloride, freed from water with calcium chloride, and distilled between 180° and 190° C. The distillate chilled, separated from adhering liquid, and again distilled. That portion distilling below 185° C. is collected and crystallized.

Extensively used in the arts as the initial substance in the production of many synthetic products.

Largely used as a disinfectant. The *phenol coefficient* may be stated as the quotient obtained by dividing the dilution of any disinfectant by the dilution of phenol required to kill the bacteria in the same time.

An ingredient in liquefied phenol, 90 per cent., *q. v.*

Antiseptic, disinfectant, germicide. Dose, 60 mg.

PHENOL LIQUEFACTUM—Liquefied Phenol—**Phenol Liq.**
Liquefied Carbolic Acid

A liquid containing 87 per cent. of C_6H_5OH (94.05).

Preserve in well-closed containers, protected from light.

Colorless liquid, which may develop a red tint upon keeping; sp. gv., about 1.065; characteristic, somewhat aromatic odor; cauterant when undiluted; burning, sweetish taste.

Miscible in all proportions in water, alcohol, and glycerin.

Prepared by melting phenol and then intimately mixing it with one-ninth of its weight of distilled water.

An ingredient in glycerite of phenol, 20 m/m; ointment of phenol, 2.25 per cent.

Antiseptic. Dose, 0.05 mil.

PHENOLPHTHALEINUM (IX) — Phenolphthalein — **Phenolphthal.**

A dibasic phenol derivative (dihydroxyphthalophenone), $C_6H_4(OH)_2CO.C_6H_4CO$ (318.11).

Permanent in the air.

White or faintly yellowish-white, crystalline powder; odorless; tasteless.

Almost insoluble in water; soluble in 13 mils of alcohol.

Obtained by heating together phenol, phthalic anhydride, and sulphuric acid for several hours; then boiling the mass with water to extract the sulphuric acid. The mass is then dissolved in dilute solution of sodium hydroxide, and the phenolphthalein precipitated with acetic acid. It is further purified by dissolving it in absolute alcohol, decolorizing with animal charcoal, and precipitating by the addition of water.

Used extensively as an indicator; colorless with acid, intensely pink with fixed alkali hydrates.

Laxative. Dose, 150 mg.

PHENYLIS SALICYLAS—Phenyl Salicylate—**Phenyl. Salicyl.** *Salol*

The phenyl ester, $C_6H_4(OH)COOC_6H_5$ (214.08), of salicylic acid.

Preserve in well-closed containers in a cool place. Melts between 41° and 43° C.

White crystalline powder; aromatic odor; characteristic taste.

Neutral to litmus. Soluble in 6670 mils of water and in 6 mils of alcohol.

Obtained by passing a slow current of phosgene gas ($COCl_2$) into a warmed mixture of sodium-phenol and sodium salicylate, washing the mass with water, and recrystallizing.

$$\underset{\text{Sodium salicylate.}}{C_6H_4OHCOONa} + \underset{\text{Sodium-phenol.}}{C_6H_5ONa} + \underset{\text{Phosgene.}}{COCl_2} =$$

$$\underset{\text{Phenyl salicylate.}}{C_6H_4(OH)COOC_6H_5} + \underset{\text{Sodium chloride.}}{2NaCl} + \underset{\text{Carbon dioxide.}}{CO_2}$$

Used in coating enteric pills.

Antiseptic, antirheumatic. Dose, 300 mg.

PHYSOSTIGMINÆ SALICYLAS—Physostigmine Salicylate—Physostig. Salicyl.—*Eserine Salicylate*

The salicylate, $C_{15}H_{21}O_2N_3.C_7H_6O_3$ (413.25), of the alkaloid physostigmine. The average yield of physostigmine from physostigma is 0.1 per cent.

It acquires a red tint when exposed to light and air. Preserve in small, well-closed containers, protected from light.

Colorless or faintly yellowish, shining, acicular, or short columnar crystals; odorless; slightly bitter taste. Caution: Poisonous.

Neutral or only slightly acid to litmus. Soluble in 75 mils of water and in 16 mils of alcohol.

Obtained by neutralizing in ether solution physostigmine, the alkaloid from physostigma, with salicylic acid and crystallizing.

Used in freshly prepared aqueous solution of 0.1 to 1 per cent. as a myotic.

Sedative, myotic. Dose, 1 mg.

PILOCARPINÆ HYDROCHLORIDUM—Pilocarpine Hydrochloride—Pilocarpin. Hydrochl.—*Pilocarpine Chloride*

The hydrochloride, $C_{11}H_{16}O_2N_2.HCl$ (244.62), of the alkaloid pilocarpine. The average yield of pilocarpine from pilocarpus is 0.4 to 1 per cent.

Hygroscopic. Preserve in well-closed containers, protected from light.

Colorless, translucent, crystals; odorless; faintly bitter taste.

Neutral or slightly acid to litmus. Soluble in 0.3 mil of water and in 3 mils of alcohol.

Obtained by neutralizing pilocarpine, the alkaloid obtained from pilocarpus, with diluted hydrochloric acid and crystallizing over sulphuric acid.

Diaphoretic, sialagogue, myotic. Dose, by mouth, 10 mg.; hypodermic, 5 mg.

PILOCARPINÆ NITRAS — Pilocarpine Nitrate — Pilocarpin. Nit.

The nitrate, $C_{11}H_{16}O_2N_2.HNO_3$ (271.17), of the alkaloid pilocarpine.

Permanent in the air. Preserve in well-closed containers, protected from light.

Colorless, shining needles; odorless; slightly bitter taste.

Soluble in 4 mils of water and in 75 mils of alcohol.

Obtained by neutralizing pilocarpine, the alkaloid of pilocarpus, with diluted nitric acid; evaporating and crystallizing from hot alcohol.

Diaphoretic, sialagogue, myotic. Dose, by mouth, 10 mg.; hypodermic, 5 mg.

PYROGALLOL—Pyrogallol—Pyrogall.—*Pyrogallic Acid; Pyro*

Trihydroxybenzene, $C_6H_3(OH)_3$ (126.05).

Acquires a grayish tint on exposure to air and light. Preserve in well-closed containers, protected from light.

White or nearly white laminæ or fine light needles; odorless; bitter taste.

Obtained from gallic acid by careful sublimation at a temperature of 200° to 210° C. Hence the name "pyro."

$$\underset{\text{Gallic acid.}}{C_6H_2(OH)_3COOH} + \underset{\text{Heat.}}{\triangle} = \underset{\text{Pyrogallol.}}{C_6H_3(OH)_3} + \underset{\text{Carbon dioxide.}}{CO_2}$$

A larger yield is obtained from gallic acid by heating it in water under pressure at a temperature of 200° to 210° C. The liquid decolorized with animal charcoal, evaporated, and the residue purified by sublimation.

Used as a reducing agent in photography, etc. It is poisonous.

Used externally in 5 to 10 per cent. ointment in the treatment of diseases of the skin.

PYROXYLINUM—Pyroxylin—**Pyroxylin.**—*Soluble Gun Cotton*

Chiefly cellulose tetranitrate, $C_{12}H_{16}O_6(ONO_2)_4$ (504.17).

Very inflammable; less explosive than cellulose hexanitrate, "explosive gun-cotton." Decomposes when kept in well-closed bottles exposed to light. Preserve in cartons, packed loosely, and protected from light and moisture.

Yellowish-white, matted mass of filaments, resembling raw cotton in appearance; harsh to the touch.

Insoluble in water. Soluble in 25 mils of a mixture of 3 volumes of ether and 1 volume of alcohol. Soluble in acetone.

Obtained by the action of a mixture of nitric and sulphuric acids on purified cotton.

An ingredient in collodion, 4 g/m, *q. v.*, and other solutions to be used externally as protective and film-forming agents.

QUINIDINA, N. F.—Quinidine—**Quinid.**

An alkaloid ($C_{20}H_{24}O_2N_2$ = 324.21) isomeric with quinine. The average yield of quinidine from yellow cinchona is 0.8 to 1 per cent.

Efflorescent if crystalline. Preserve in well-closed containers, protected from light.

White, acicular crystals, or amorphous powder; odorless; intense, persistent, bitter taste.

Alkaline to litmus. Almost insoluble in water; soluble in about 36 mils of alcohol.

Obtained from the bark of various species of cinchona. It is obtained chiefly from the mother liquors from the recrystallization of quinine sulphate. The sulphate of quinidine thus separated is dissolved in water and precipitated by ammonia-water.

Used in place of quinine. Less agreeable to take, but more prompt in its action.

Tonic. Dose, 100 mg.

Antimalarial. Dose, 1 gm. daily.

QUININA—Quinine—**Quin.**

An alkaloid, $C_{20}H_{24}O_2N_2 + 3H_2O$ (378.26). The average yield from yellow cinchona is 1 to 12 per cent.; from red cinchona, 0.4 to 2.5 per cent.

Efflorescent in dry air. Preserve in well-closed containers, protected from light.

White, microcrystalline powder; odorless; bitter taste, developing rather slowly, but intense and persistent.

Alkaline to litmus. Soluble in 1560 mils of water and in 0.8 mil of alcohol.

Obtained by precipitating a solution of quinine sulphate with a very slight excess of ammonia-water.

Antimalarial. Dose, at least 1 gm. daily.

Tonic. Dose, 100 mg.

QUININÆ BISULPHAS—Quinine Bisulphate—**Quin. Bisulph.**

The acid sulphate, $C_{20}H_{24}O_2N_2H_2SO_4 + 7H_2O$ (548.41), of the alkaloid quinine.

Efflorescent. Preserve in well-closed containers, protected from light.

Colorless, transparent, or whitish orthorhombic crystals or small needles; odorless; very bitter taste.

Acid to litmus. Aqueous solution has a blue fluorescence. Soluble in 9 mils of water and in 23 mils of alcohol.

Obtained from quinine sulphate by adding to it diluted sulphuric acid and crystallizing.

It is preferred to the sulphate on account of its greater solubility in water.

Antimalarial. Dose, at least 1 gm. daily.

Tonic. Dose, 100 mg.

QUININÆ DIHYDROCHLORIDUM (IX)—Quinine Dihydrochloride—**Quin. Dihydrochlor.**

The dihydrochloride, $C_{20}H_{24}O_2N_2.2HCl$ (397.15), of the alkaloid quinine.

Preserve in well-closed containers, protected from light.

White powder; odorless; very bitter taste.

Strongly acid to litmus. Soluble in about 0.6 mil of water and in 12 mils of alcohol.

Obtained by adding a solution of barium chloride to a solution of quinine sulphate, filtering off the precipitated barium sulphate, and evaporating the solution.

Considered preferable to quinine hydrochloride for hypodermic use on account of its greater solubility.

Antimalarial. Dose, at least 1 gm. daily.

Tonic. Dose, 100 mg.

QUININÆ ET UREÆ HYDROCHLORIDUM (IX)—Quinine and Urea Hydrochloride—Quin. et Urea. Hydrochl.—*Quinine and Urea Chloride*

A compound of the hydrochlorides of quinine and urea, $C_{20}H_{24}O_2N_2HCl.CO(NH_2)_2.HCl + 5H_2O$ (547.28), which contains not less than 58 per cent. of anhydrous quinine.

Permanent in the air. Preserve in well-closed containers protected from light.

Colorless, translucent prisms, or white granular powder; odorless; very bitter taste.

Strongly acid to litmus. Soluble in 0.9 mil of water and in 2.4 mils of alcohol.

Obtained by crystallizing a solution containing quinine hydrochloride, diluted hydrochloric acid, and urea.

Local anesthetic, substitute for cocaine, 1 per cent. solution in sterilized water.

Antimalarial. Dose, hypodermic, one dose daily, 1 gm. (Usually in 50 per cent. aqueous solution.)

QUININÆ GLYCEROPHOSPHAS, N. F.—Quinine Glycerophosphate—Quin. Glycerophos.—*Quinine Glycerinophosphate; Kineurine*

The glycerophosphate, $(C_{20}H_{24}O_2N_2)_2\ C_3H_5(OH)_2H_2PO_4 + 4H_2O$ (892.60), of the alkaloid quinine.

Preserve in well-stoppered, amber-colored bottles.

White, fine, crystalline needles or powder; odorless; very bitter taste.

Soluble in 850 mils of water and in 75 mils of alcohol.

Obtained by decomposing a solution of quinine hydrochloride with a solution of calcium glycerophosphate, washing the resulting precipitate with cold water, and drying; also by adding a solution of glycerophosphoric acid in absolute alcohol to a solution of quinine in ether, collecting the precipitate, washing it with ether, and drying.

Tonic. Dose, 100 mg.

Antimalarial. Dose, 1 gm. daily.

QUININÆ HYDROBROMIDUM—Quinine Hydrobromide—Quin. Hydrobr.—*Quinine Bromide*

The hydrobromide, $C_{20}H_{24}O_2N_2.HBr + H_2O$ (423.16), of the alkaloid quinine.

Efflorescent. Preserve in well-closed containers, protected from light.

White, light, silky needles; odorless; very bitter taste.

Neutral or not more than slightly alkaline to litmus. Soluble in 40 mils of water and 0.9 mil of alcohol.

Obtained by dissolving quinine in warm diluted hydrobromic acid and crystallizing.

Antimalarial. Dose, at least 1 gm. daily.

Tonic. Dose, 100 mg.

QUININÆ HYDROCHLORIDUM—Quinine Hydrochloride—Quin. Hydrochl.—*Quinine Chloride*

The hydrochloride, $C_{20}H_{24}O_2N_2.HCl + 2H_2O$ (396.71), of the alkaloid quinine.

Efflorescent in warm air. Preserve in well-closed containers, protected from light.

White, silky, glistening needles; odorless; very bitter taste.

Neutral or not more than slightly alkaline to litmus. Soluble in 18 mils of water and in 0.8 mil of alcohol.

Obtained by dissolving quinine in diluted hydrochloric acid and crystallizing.

Claimed to be less liable to produce abscesses than other quinine salts when administered hypodermically.

Antimalarial. Dose, at least 1 gm. daily.

Tonic. Dose, 100 mg.

QUININÆ HYPOPHOSPHIS, N. F.—Quinine Hypophosphite —Quin. Hypophos.

The hypophosphite, $C_{20}H_{24}O_2N_2HPH_2O_2 + 2H_2O$ (426.31), of the alkaloid quinine.

Preserve in well-stoppered, amber-colored bottles.

White, silky, glistening needles or prisms; odorless; very bitter taste.

Soluble in 35 mils of water and in 12.5 mils of alcohol.

Obtained by mixing an alcoholic solution of quinine sulphate with an aqueous solution of calcium hypophosphite, filtering after an hour or so, then concentrating the filtrate and crystallizing.

Tonic. Dose, 100 mg.

Antimalarial. Dose, 1 gm. daily.

QUININÆ SALICYLAS—Quinine Salicylate—Quin. Salicyl.

The salicylate, $C_{20}H_{24}O_2N_2.C_7H_6O_3 + H_2O$ (480.28), of the alkaloid quinine.

Permanent in the air. Often assumes a pinkish color on keeping. Preserve in well-closed containers, protected from light.

Colorless needles; odorless; bitter taste.

Alkaline to litmus. Slightly soluble in water, soluble in 14 mils of alcohol.

Obtained by double decomposition between quinine sulphate and sodium salicylate, and collecting, washing, and drying the precipitate of quinine salicylate.

Antirheumatic, antiperiodic, antimalarial. Dose, at least 1 gm. daily.

Tonic. Dose, 100 mg.

QUININÆ SULPHAS—Quinine Sulphate—Quin. Sulph.—*Quinine*

The sulphate, $(C_{20}H_{24}O_2N_2)_2.H_2SO_4 + 7H_2O$ (872.62), of the alkaloid quinine.

Efflorescent; when exposed to light acquires a brownish tint. Preserve in well-closed containers, protected from light.

White, silky, light, flexible, glistening crystals, or hard, prismatic, monoclinic needles; odorless; persistent, very bitter taste.

Neutral or not more than slightly alkaline to litmus. Soluble in 725 mils of water and in 107 mils of alcohol.

Obtained from the barks of various species of cinchona by methods the details of which are known only to the manufacturers. In general, the alkaloids are set free by mixing the finely ground bark with milk of lime, from which mixture they are separated by immiscible solvents; and from the immiscible solvents by shaking out with diluted sulphuric acid. The quinine is separated from the mixed sulphates thus obtained by a series of fractional solutions, precipitations, and crystallizations.

The most important salt of the cinchona alkaloids.

Antimalarial. Dose, at least 1 gm. daily.

Tonic. Dose, 100 mg.

QUININÆ TANNAS (IX)—Quinine Tannate—Quin. Tann.—
Tasteless Quinine

A compound of the alkaloid quinine with tannic acid of varying composition, but containing 30 to 35 per cent. of anhydrous quinine.

Preserve in well-closed containers, protected from light.

Pale yellow or yellowish-white amorphous powder; odorless; tasteless or having not more than a slightly bitter and astringent taste.

Slightly soluble in water, somewhat more soluble in alcohol.

Obtained by precipitating a solution of quinine sulphate with a solution of tannic acid and a small amount of ammonia-water, and washing and drying the precipitate.

Owing to its comparative tastelessness it is recommended for administration to children and others who require a small dose of the alkaloid and cannot swallow pills or capsules.

Antiperiodic. Dose, 200 mg.

QUININÆ VALERAS, N. F.—Quinine Valerate—Quin. Valer.
Quinine Valerianate

The valerate ($C_{20}H_{24}O_2N_2HC_5H_9O_2 + H_2O = 443.30$) of the alkaloid quinine.

Preserve in well-stoppered, amber-colored bottles.

White, lustrous crystals; odor of valeric acid; intensely bitter taste.

Sparingly soluble in water; readily soluble in alcohol.

Obtained by carefully adding valeric acid to a saturated alcoholic solution of quinine until it is neutral or slightly acid, then pouring the mixture into 2 volumes of water, and evaporating the liquid at a low temperature and crystallizing.

Tonic. Dose, 100 mg.

Antimalarial. Dose, 1 gm. daily.

RENNINUM, N. F.—Rennin—*Chymosin*

The partially purified milk-curdling enzyme obtained from the glandular layer of the stomach of the calf, and capable of coagulating not less than 25,000 times its weight of fresh milk. Rennin of higher coagulating power may be brought to the standard by admixture with sodium chloride and sugar of milk.

Rennin deteriorates rapidly and must be kept in well-stoppered, amber-colored bottles, in a cool place.

Grayish-white, yellowish-white powder or pale yellow granules or scales; peculiar, not unpleasant odor; characteristic and slightly saline taste.

Slowly soluble in water and in diluted alcohol, solutions being more or less opalescent.

Obtained by various processes which are regarded more or less as trade secrets. In general, the method consists of digesting the rennets (the abomasum or fourth stomach of the calf) with weak acid (hydrochloric) to complete solution; separating the fatty matter and evaporating and scaling the clarified solution (scale rennin). The clarified solution may also be precipitated by saturating it with sodium sulphate, which yields a rennin of higher coagulating power; or by saturating it with sodium chloride, in which case the yield is smaller and the coagulating power correspondingly higher, approximately five times.

Used for the purpose of preparing curds or whey (junket) and in cheese making.

An ingredient in compound elixir of pepsin and rennin, N. F., 1.65 g/m.

Rarely administered *by itself.*

RESORCINOL—Resorcinol—**Resorcin.**—*Resorcin*

Metadihydroxybenzene, $C_6H_4(OH)_2$ (110.05).

Acquires a pink color on exposure to air. Preserve in well-closed containers, protected from light.

Colorless or nearly colorless, needle-shaped crystals, or powder; faint peculiar odor; sweetish, followed by a bitter taste.

Neutral or only slightly acid to litmus. Soluble in 0.9 mil of water or alcohol.

Obtained from benzene by heating it with sulphuric acid, whereby benzene-meta-disulphonic acid is formed; neutralizing with milk of lime, separating the insoluble calcium sulphate by filtration and transposing the soluble calcium benzene-meta-disulphonate with sodium carbonate, separating the insoluble calcium carbonate by filtration, and evaporating the solution of sodium benzene-meta-disulphonate to dryness. This residue is fused with sodium hydroxide, whereby sodium resorcin ($C_6H_4(ONa)_2$) and sodium sulphite are formed. This fused mass is dissolved in water acidulated with hydrochloric acid and boiled until the sulphurous acid is expelled, the solution cooled, filtered, and "shaken out" with ether. The ether solution upon distillation leaves a residue of resorcin, which is purified by sublimation.

Antiseptic, resembling phenol. Diaphoretic. Dose, 125 mg.

SACCHARUM—Sugar—**Sacch.**—*Sucrose; Cane-sugar*

Sucrose, a carbohydrate having the formula $C_{12}H_{22}O_{11}$ (342.18).

Permanent in the air.

White, hard, dry crystals or white crystalline powder; odorless; sweet taste.

Neutral to litmus. Soluble in 0.5 mil of water and in 170 mils of alcohol.

Obtained from the juice of the sugar-cane or the juice of the sugar-beet by careful evaporation *in vacuo* and crystallizing.

Used in the preparation of syrups, troches, confections, and many other sweetened preparations.

Used to disguise the taste of medicines and to prevent their decomposition.

Has some sedative and demulcent properties.

SACCHARUM LACTIS—Sugar of Milk—**Sacch. Lact.**—*Milk-sugar; Lactose*

Lactose, $C_{12}H_{22}O_{11} + H_2O$ (360.19).

Permanent in the air. It readily absorbs odors. Preserve in tightly closed containers.

White, hard, crystalline masses, or white powder; odorless; faintly sweet taste; produces a gritty sensation on the tongue.

Neutral to litmus. Soluble in 4.9 mils of water; almost insoluble in alcohol.

Obtained by concentrating whey and crystallizing. To facilitate the crystallization cords or thin sticks are introduced into the vats. It is purified by recrystallization.

Used as a diluent and in the preparation of triturates, 90 per cent. It is not so sweet as cane-sugar and is believed to be more readily digested.

An ingredient in powder of ipecac and opium, 80 per cent.; saccharated ferrous carbonate, 10 per cent.; trituration of elaterin, 90 per cent.

Slightly diuretic.

SALICINUM—Salicin—**Salicin.**

A glucoside, $C_{13}H_{18}O_7$ (286.14).

Preserve in well-closed containers.

Colorless, silky, shining, crystalline needles or rhombic prisms, or white crystalline powder; odorless; very bitter taste.

Neutral to litmus. Soluble in 23.5 mils of water and in 88.5 mils of alcohol.

Obtained from willow bark. A decoction of the bark is precipitated with lead subacetate solution, neutralized with sodium carbonate, the clear solution concentrated, and the crystals of salicin purified by recrystallization.

A substitute for salicylic acid, though inferior; also inferior to quinine as an antiperiodic.

Antiseptic, antiferment. Dose, 1 gm.

SANTONINUM—Santonin—**Santonin.**

An inner anhydride or lactone, $C_{15}H_{18}O_3$ (246.14), of santonic

Permanent in the air. Becomes yellow upon exposure to light. Preserve in well-closed containers, protected from light.

Colorless, shining, flattened rhombic prisms or crystalline powder; odorless; nearly tasteless at first, but afterward developing a bitter taste.

Neutral to litmus. Very slightly soluble in water; soluble in 43 mils of alcohol.

Obtained from santonica by mixing the powdered drug with slaked lime and extracting with hot water. The solution of calcium santonate thus obtained is concentrated and the crude santonin precipitated by the addition of hydrochloric acid. It may be purified by recrystallization from hot alcohol.

Discolored santonin may be reconverted into colorless crystals by recrystallization from alcohol.

Anthelmintic. Dose, 60 mg.

SCOPOLAMINÆ HYDROBROMIDUM—Scopolamine Hydrobromide—**Scopolamin. Hydrobrom.**—*Hyoscine Hydrobromide*, U. S. P. VIII; *Scopolamine Bromide*

The hydrobromide, $C_{17}H_{21}O_4N.HBr + 3H_2O$ (438.15), of the lævorotatory alkaloid scopolamine, also known as hyoscine. The average yield of scopolamine from scopola is about 0.05 per cent.

Slightly efflorescent. Preserve in well-closed containers, protected from light.

Colorless, transparent, rhombic crystals, sometimes of large size; odorless; bitter taste. Caution: Poison.

Neutral or only slightly acid to litmus. Soluble in 1.5 mils of water and in 20 mils of alcohol.

Obtained chiefly from the seed of hyoscyamus and stramonium, also from scopola, U. S. P. VIII, and other plants of the Solanaceæ. It may be obtained from the mother liquors after the removal of the hyoscyamine by neutralizing them with hydrobromic acid and precipitating with absolute alcohol.

Used in connection with morphine hypodermically to aid in the anesthesia induced by ether and chloroform.

Hypnotic, mydriatic, antispasmodic. Dose, 0.3 mg.

SPARTEINÆ SULPHAS — Sparteine Sulphate — **Spartein. Sulph.**

The sulphate ($C_{15}H_{26}N_2.H_2SO_4 + 5H_2O = 422.39$) of the liquid, volatile alkaloid sparteine. The average yield of sparteine from scoparius is about 0.04 to 0.5 per cent.

Hygroscopic. Preserve in well-closed containers, protected from light.

Colorless, rhombohedral crystals, or a crystalline powder; odorless; slightly saline and somewhat bitter taste.

Neutral or acid to litmus. Soluble in 1.1 mil of water and in 3 mils of alcohol.

Obtained by dissolving the alkaloid sparteine obtained from scoparius in dilute sulphuric acid and crystallizing.

Heart tonic. Dose, 10 mg.

STROPHANTHINUM—Strophanthin—**Strophanthin.**

A glucoside or mixture of glucosides containing varying amounts of water which it does not lose entirely without decomposition.

Permanent in the air. Preserve in well-closed containers, protected from light.

White or yellowish-white powder; odorless; intensely bitter taste. Caution: Poisonous.

Neutral to litmus. Very soluble in water and alcohol.

Obtained from strophanthus. The finely powdered seeds are defatted by extraction with ether or benzin; then extracted with 70 per cent. alcohol; the tincture evaporated; the residue dissolved in water; the aqueous solution precipitated with tannic acid; the precipitate mixed with litharge; dried; then exhausted with alcohol and the strophanthin precipitated from the alcoholic solution by the addition of ether.

Heart stimulant. Dose, by mouth, 1 mg. Intravenously, 0.75 mg.

STRYCHNINA—Strychnine—**Strych.**

An alkaloid, $C_{21}H_{22}O_2N_2$ (334.20). The average yield from nux vomica is 1 to 2 per cent.

Permanent in the air. Preserve in well-closed containers.

Colorless, transparent, prismatic crystals, or white, crystalline powder; odorless; exceedingly bitter taste. Caution: Poison.

Alkaline to litmus. Soluble in 6420 mils of water and in 136 mils of alcohol.

Obtained from nux vomica and other seeds of the Loganiaceæ. The powdered drug is extracted with dilute hydrochloric acid; this extract precipitated with slaked lime; the precipitate washed with water and then with cold diluted alcohol to remove the brucine; then with boiling alcohol to remove the strychnine. The alcohol is evaporated, dilute sulphuric acid added to the residue, and the sulphate of strychnine purified by recrystallization. The free alkaloid is obtained from the sulphate by dissolving it in water and precipitating it by the addition of an alkali. It may be further purified by recrystallization from hot alcohol.

Used in the preparation of other salts of strychnine. Rarely administered as the free alkaloid.

Circulatory and respiratory stimulant, stomachic, motor excitant. Dose, 1.5 mg.

STRYCHNINÆ GLYCEROPHOSPHAS, N. F.—Strychnine Glycerophosphate—**Strych. Glycerophos.**—*Strychnine Glycerinophosphate*

The glycerophosphate ($(C_{21}H_{22}O_2N_2)_2C_3H_5(OH)_2H_2PO_4 + 6H_2O = 948.60$) of the alkaloid strychnine.

Preserve in well-stoppered bottles.

White rhombic crystals or powder; odorless; at first faint, sweet taste, afterward becoming intensely bitter.

Neutral or slightly alkaline to litmus. Soluble in about 350 mils of water and in about 310 mils of alcohol.

Obtained by dissolving powdered strychnine in glycerophosphoric acid and evaporating and crystallizing.

Tonic, reconstructive. Dose, 1.5 mg.

STRYCHNINÆ NITRAS—Strychnine Nitrate—**Strych. Nit.**

The nitrate, $C_{21}H_{22}O_2N_2.HNO_3$ (397.21), of the alkaloid strychnine.

Permanent in the air. Preserve in well-closed containers, protected from light.

Colorless, glistening needles, or white crystalline powder; odorless; exceedingly bitter taste. Caution: Poison.

Neutral or slightly acid to litmus. Soluble in 42 mils of water and in 150 mils of alcohol.

Obtained by dissolving strychnine in hot diluted nitric acid and crystallizing.

Circulatory and respiratory stimulant, motor excitant, stomachic. Dose, 1.5 mg.

STRYCHNINÆ SULPHAS — Strychnine Sulphate — **Strych. Sulph.**

The sulphate, $(C_{21}H_{22}O_2N_2)_2.H_2SO_4 + 5H_2O$ (856.56), of the alkaloid strychnine.

Efflorescent in dry air. Preserve in well-closed containers.

Colorless or white prismatic crystals, or a white, crystalline powder; odorless; intensely bitter taste. Caution: Poison.

Neutral or very slightly acid to litmus. Soluble in 32 mils of water and in 81 mils of alcohol.

Obtained by adding powdered strychnine to a slight excess of warm diluted sulphuric acid and crystallizing. See also *Strychnine.*

Circulatory and respiratory stimulant, stomachic, motor-excitant. Dose, 1.5 mg.

STRYCHNINÆ VALERAS, N. F.—Strychnine Valerate—**Strych. Valer.**

The valerate ($C_{21}H_{22}O_2N_2.HC_5H_9O_2 = 436.28$) of the alkaloid strychnine.

Preserve in well-stoppered, amber-colored vials.

White crystalline powder; odor of valeric acid; intensely bitter taste.

Neutral or slightly alkaline to litmus. Sparingly soluble in water, becoming less soluble on keeping, through loss of valeric acid; soluble in alcohol.

Obtained by dissolving powdered strychnine in valeric acid and water and evaporating and crystallizing.

Tonic. Dose, 1.5 mg.

SULPHONETHYLMETHANUM—Sulphonethylmethane—**Sulphonethylmeth.**—*Trional; Methylsulphonal*

Diethylsulphonemethylethylmethane, $(CH_3)(C_2H_5)C(SO_2C_2H_5)_2$ (242.28).

Preserve in well-closed containers. Melts between 74° and 76° C.

Colorless, lustrous, crystalline scales; odorless; bitter taste.

Neutral to litmus. Soluble in 200 mils of water; soluble in ether.

Obtained by saturating a solution of ethyl mercaptan (C_2H_5SH) and methyl-ethyl-ketone ($CH_3.C_2H_5CO$) with hydrochloric acid gas and oxidizing the resulting condensation product, known as methyl-ethyl-ketone-mercaptol, $CH_3C_2H_5C(SC_2H_5)_2$, with a weak solution of potassium permanganate and purifying the product by recrystallization.

Hypnotic. Dose, 0.75 gm.

SULPHONMETHANUM—Sulphonmethane—**Sulphonmeth.**—*Sulphonal*

Diethylsulphonedimethylmethane, $(CH_3)_2C(SO_2C_2H_5)_2$ (228.27).

Preserve in well-closed containers. Melts between 124° and 126° C.

Colorless primastic crystals, or crystalline powder; odorless; nearly tasteless.

Neutral to litmus. Soluble in 365 mils of water and in 60 mils of alcohol.

Obtained by passing dry hydrochloric acid gas into a mixture of acetone (CH_3COCH_3) and anhydrous mercaptan (C_2H_5SH), producing mercaptol ($(CH_3)_2C(SC_2H_5)_2$) which, after purifying, is oxidized with dilute permanganate of potash solution, and the resulting sulphonal is purified by recrystallization from alcohol or water.

Hypnotic. Dose, 0.75 gm.

TEREBENUM—Terebene—**Tereben.**

A liquid consisting of dipentene ($C_{10}H_{16}$) and other hydrocarbons.

On exposure to light and air it gradually becomes resinified and acquires an acid reaction. Preserve in well-closed containers, protected from light. Boils between 160° and 172° C.

Colorless, thin liquid; sp. gv., 0.860 to 0.865; agreeable, thyme-like odor; aromatic, somewhat terebinthinate taste.

Neutral in reaction. Slightly soluble in water; soluble in 3 mils of alcohol.

Obtained by acting upon oil of turpentine with concentrated sulphuric acid until it becomes optically inactive, separating the oily liquid, neutralizing it by treatment with caustic soda, and finally distilling it with steam.

Expectorant. Diuretic. Dose, 0.25 mil.

TERPINI HYDRAS—Terpin Hydrate—**Terpin. Hyd.**

The hydrate, $C_{10}H_{18}(OH)_2 + H_2O$ (190.18), of the dihydric alcohol terpin.

Slowly volatile. Efflorescent in dry air. Preserve in well-closed containers, in a cool place.

Colorless, lustrous, rhombic prisms; nearly odorless; slightly aromatic and somewhat bitter taste.

Neutral to litmus. Soluble in about 200 mils of water and in 13 mils of alcohol.

Obtained by the action of nitric acid upon an alcoholic solution of oil of turpentine; after several days the crystals which have formed are separated and purified by recrystallization from 90 per cent. alcohol which has been rendered slightly alkaline.

Expectorant. Diuretic. Dose, 250 mg.

THEOBROMINÆ SODIO-SALICYLAS (IX)—Theobromine Sodio-Salicylate—**Theobrom. Sodio-Sal.**—*Diuretin*

A mixture of sodium theobromine, $C_7H_7O_2N_4Na$ (202.10), and sodium salicylate, $C_7H_5O_3Na$ (160.04), in approximately molecular proportions. The average yield of theobromine from theobroma is 1 to 2.5 per cent.; from the "shells" or seed coats, 0.5 to 4.5 per cent.

Contains, when dried to constant weight over sulphuric acid, not less than 46.5 per cent. of theobromine.

Gradually absorbs carbon dioxide with the liberation of theobromine, becoming partially insoluble in water. Preserve in well-closed containers.

White powder; odorless; sweetish, saline, somewhat alkaline taste.

Strongly alkaline to litmus. Soluble in 1 mil of water; slightly soluble in alcohol.

Obtained by mixing a pure aqueous solution of sodium hydroxide with theobromine in the proper proportion and warming to solution, then adding solution of sodium salicylate and evaporating to dryness.

Diuretic. Dose, 1 gm.

THEOPHYLLINA (**IX**)—Theophylline—**Theophyll.**—*Dimethylxanthine*

An organic base, $C_5H_2(CH_3)_2.O_2N_4 + H_2O$ (198.12), isomeric with theobromine. The average yield from tea is so small that the commercial product is made synthetically.

White, crystalline powder; odorless; bitter taste.

Neutral to litmus. Soluble in 100 mils of water and in 80 mils of alcohol.

Obtained in small quantities from tea leaves; also prepared synthetically by a somewhat complicated process in which ammonia, carbon dioxide, acetic and formic acids, and potassium cyanide are used. It is the first instance of a successful, strictly artificial method for the preparation of an alkaloid on a commercial scale.

Believed to be more efficient than caffeine.

Diuretic. Dose, 250 mg.

THYMOL—Thymol—*Thymic Acid*

A phenol, $C_6H_3(CH_3)(OH)(C_3H_7)$ (150.11), occurring in certain volatile oils.

Volatile. Preserve in well-closed containers. Melts between 48° and 51° C.

Colorless, large, translucent, rhombic prisms; aromatic, thyme-like odor; pungent, aromatic taste; very slight caustic effect upon the lips.

Neutral to litmus. Soluble in 1010 mils of water and in about 1 mil of alcohol.

Obtained from oil of thyme, but principally from the oil of ajowan seed. The rectified oil is treated with sodium hydroxide solution, whereby the thymol passes into the aqueous solution as sodium thymol. The thymol is precipitated from the aqueous solution by hydrochloric acid and purified by recrystallization from diluted alcohol.

Antiseptic. Dose, 125 mg.

Anthelmintic. Dose, 1 gm.

THYMOLIS IODIDUM — Thymol Iodide — **Thymol. Iod.** — *Aristol*

Chiefly dithymol-diiodide, $(C_6H_2.CH_3.C_3H_7.OI)_2$ (550.03), containing, when dried to constant weight over sulphuric acid, not less than 43 per cent. of iodine.

Preserve in well-closed containers, protected from light.

Reddish-brown or reddish-yellow, bulky powder, slight aromatic odor; almost tasteless.

Insoluble in water and glycerin; slightly soluble in alcohol.

Obtained by adding an aqueous solution of iodine in potassium iodide to a solution of thymol in solution of sodium hydroxide, and collecting, washing, and drying the precipitate.

Used as a substitute for the disagreeable smelling iodoform.

Antiseptic dusting-powder. Used externally.

TRINITROPHENOL (IX) — Trinitrophenol — **Trinitrophen.** — *Picric Acid*

Trinitrophenol, $C_6H_2(OH)(NO_2)_3$ (229.05).

Explodes when heated rapidly or when subjected to percussion. For safety in transportation it is usually mixed with about 20 per cent. of water. The water may be removed by drying in a desiccator over sulphuric acid. Preserve in well-stoppered bottles, in a cool place, remote from fire.

Pale yellow, rhombic prisms or scales; odorless; intensely bitter taste.

Acid to litmus. Soluble in 78 mils of water and in 12 mils of alcohol.

Obtained by the action of nitric acid upon phenol.

Employed as a precipitant for albumin and as a hardening agent in microscopy.

Used externally in the form of a solution (trinitrophenol, 6 gm.; alcohol, 60 mils; water, 1000 mils) as an application to burns. Also in the form of 2 per cent. ointment.

Administered internally in the form of a mixture.

Bitter tonic. Dose, 30 mg.

VANILLINUM—Vanillin—**Vanillin.**

Methylprotocatechuic aldehyde, $C_6H_3(OH)(OCH_3)(CHO)$ (152.06).

Preserve in well-closed containers, protected from light. Melts between 80° and 82° C.

White or very slightly yellowish fine needles; odor and taste of vanilla.

Acid to litmus. Soluble in 100 mils of water; freely solubly in alcohol.

Obtained from vanilla, but usually made synthetically from eugenol or from coniferin. Eugenol ($C_6H_3(OH)(OCH_3)(C_3H_5)$) is boiled with acetic anhydride ($(CH_3CO)_2O$), whereby acetyl eugenol ($C_6H_3O(OC_2H_3)OCH_3C_3H_5$) is formed. This is oxidized with a dilute solution of potassium permanganate, whereby acetyl vanillin ($C_6H_3O(OC_2H_3)(OCH_3)CHO$) is formed. This is heated with dilute solution of sodium hydroxide, whereby sodium vanillin ($C_6H_3ONa(OCH_3)CHO$) is formed. This is treated with dilute sulphuric acid and the vanillin shaken out with ether and purified by appropriate methods.

Employed as a perfume and in the manufacture of artificial vanilla extracts.

Stomachic, motor excitant. Dose, 300 mg.

VERATRINA—Veratrine—**Veratrin.**—*Veratria*

A mixture of alkaloids consisting principally of a mixture of cevadine, cevadilline, and veratridine. The average yield from sabadilla is about 1 per cent.

Slightly hygroscopic. Preserve in well-closed containers, protected from light.

White or grayish-white, amorphous powder; odo
causing intense irritation and sneezing; bitter,
Use caution in smelling and tasting.

Alkaline to litmus. Soluble in 1760 mils of wate
of alcohol.

Obtained from pulverized cevadilla seed by extraction with 80 per cent. alcohol; evaporate and precipitate the resin by the addition of water; filter and precipitate the alkaloids in the filtrate with ammonia. The precipitated alkaloids are dissolved in sufficient hydrochloric acid, decolorized with animal charcoal, again precipitated with ammonia, collected on a filter, washed, and dried.

Local irritant, analgesic. Prescribed in oleate or ointment.

RECAPITULATION OF THE U. S. P. AND N. F. DRUGS OF ANIMAL ORIGIN

Latin name.	Source.	Remarks.
Acidum Lacticum	Milk-sugar and glucose.	Page 211.
Acidum Oleicum	Animal and vegetable fats.	Page 211.
Acidum Stearicum	Animal fats.	Page 213.
Adeps	Abdominal fat of the hog.	Page 377.
Adeps Benzoinatus	Adeps and Siam Benzoin.	Page 378.
Adeps Lanæ	Sheep wool fat.	Page 378.
Adeps Lanæ Hydrosus	Adeps Lanæ and Water.	Page 379.
Cantharis	Insects (dried beetles).	Epispastic.
Cera Alba	Yellow wax.	Page 229.
Cera Flava	Honey comb.	Page 230.
Cetaceum	Head of the sperm whale.	Page 230.
Coccus	Females of the insect coccus cacti.	Valuable for their red coloring-matter.
Extractum Carnis, N. F.	Fresh meat.	Obtained by evaporating meat broth.
Fel Bovis	The gall-bladder of the ox.	Laxative, cholagogue.
Gelatinum	Bones, ligaments, and skins.	Page 242.
Gelatinum glycerinatum	Gelatine and glycerine.	Page 242.
Glycerinum	Fats and oils.	Page 243.
Hypophysis Sicca (IX).	Posterior lobe of the pituitary body of cattle.	Parturient.
Lac Vaccinum, N. F.	Domestic cow.	Fresh milk of legal standard quality.
Liquor Hypophysis (IX)	The fresh posterior lobe of the pituitary body of cattle.	Page 341.
Mel	Honey	Flavoring agent.
Mel Depuratum	Honey and 5 per cent. of its weight of glycerin.	Flavoring agent.

Latin name.	Source.	Remarks.
Moschus	Preputial follicles of the musk deer.	Stimulant, restorative in collapse; used in the perfume industry.
Oleum Morrhuæ	Livers of the codfish.	Page 356.
Ovi Albumen Recens, N. F.	Eggs of the hen.	Fresh egg white (albumen).
Ovi Vitellum Recens, N. F.	Eggs of the hen.	Freshly separated yolk of egg.
Ovum Gallinaceum, N. F.	Hen.	The recently laid egg.
Pancreatinum	The pancreas of the hog.	Page 251.
Pepsinum	The glandular layer of the fresh stomach of the hog.	Page 253.
Renninum, N. F.	Calves' stomachs.	Page 266.
Saccharum Lactis	Milk.	Page 268.
Serum Antidiphthericum	The coagulated blood of horses which have been immunized against diphtheria toxin.	Page 389.
Serum Antidiphthericum Purificatum (IX)	Antidiphtheric serum.	Page 390. Solution.
Serum Antidiphthericum Siccum (IX)	Antidiphtheric or the purified antidiphtheric serum.	Page 390.
Serum Antitetanicum (IX)	The coagulated blood of horses which have been immunized against tetanus toxin.	Page 391.
Serum Antitetanicum Purificatum (IX)	Antitetanic serum.	Page 391.
Serum Antitetanicum Siccum (IX)	Antitetanic or the purified antitetanic serum.	Page 392.
Sevum Præparatum	Abdominal fat of the sheep.	Page 379.
Virus Vaccinicum (IX)	Vaccinated animals of the bovine species.	
Suprarenalum Siccum	Suprarenal glands.	From are t mar
Thyroideum Siccum	Thyroid glands.	As ab fro

CHAPTER IV

PHARMACEUTIC PREPARATIONS, U. S. P. IX and N. F. IV

CLASSIFICATION OF REMEDIAL SUBSTANCES AND PREPATIONS

CLASSIFICATION may be based on utility, the choice, of course, depending upon the purpose intended. The following will serve as examples:

Official or **Pharmacopœial** (U. S. P.) **substances** are those agents described in the Pharmacopœia.

National Formulary, N. F., substances are those agents described in the National Formulary.

In this connection it should be remembered that a *preparation* is any substance manufactured according to a recognized formula. Hence a *Pharmacopœial preparation* is one that is prepared according to a formula that is outlined in the Pharmacopœia.

Chemical preparations are those whose production requires chemical reaction.

Galenical (galenic) preparations are those whose production does not require chemical reaction. They are so named in honor of the ancient Greek physician and philosophical writer, Galen (Claudius Galenus, born 130, died about 201 A. D.), who for many years was the supreme authority in medical sciences.

According to the method of manufacture preparations may be extractive, prepared by some process of extraction, or nonextractive, prepared by solution or simple mixture. The classification may in some instances take its name from the specific method used in the preparation of its members, as, for example, infusions, prepared by infusion; decoctions, prepared by decoction; triturates, prepared by trituration, etc.

According to their physical condition they may be solid, semisolid, semiliquid, or liquid, and, if liquid, they may be either *solutions or mixtures.*

According to some relation in their composition they may be aqueous, alcoholic, ethereal, glycerinic, saccharine, etc.

According to their method of application they may be employed externally, or for internal or systemic treatment.

The student should construct examples of these and make as many other classifications as possible.

TERMS USED IN DISCUSSING OFFICIAL PREPARATIONS

Adjuvant.—A substance added to the principal remedial agent in a preparation to assist its action.

Corrigent.—A substance which favorably modifies the action of another drug which is too powerful or harsh.

Vehicle.—The carrier, diluent, or solvent in any preparation.

Excipient.—The substance which is added to a solid preparation, such as pills, to give them their proper consistency.

Basis.—The principal ingredient in any compound or preparation.

Diluent.—A substance, either liquid or solid, which is added to a medicinal preparation to increase its bulk.

Base.—Same as *Basis*. Not to be confused with *Base,* page 85.

PHARMACEUTIC PREPARATIONS

ACETA—VINEGARS

Origin.—L. *acetum*, soured wine, vinegar.

Number Official, 1; U. S. P. VIII, 2; N. F., 2.

Definition.—Vinegars are solutions of the active principles of drugs in diluted acetic acid.

Method of Preparation.—Maceration.

Advantage of Class.—Acetic acid is a good solvent. It possesses antiseptic properties and can be obtained cheaply. Vinegars are uniform in strength, 10 per cent.

Incompatibilities.—Vinegars have the incompatibilities of acid liquids; that is, they are incompatible with alkalies and alkali carbonates.

Preservation.—Vinegars tend to deposit on long standing: hence they should be kept in tall bottles so that the clear l can be decanted as desired.

Administration.—They are administered either combination with other liquid remedies, usually la

ACETUM SCILLÆ—Vinegar of Squill—**Acet. Scill.**

Prepared by macerating 10 gm. squill in No. 20 powder with 90 mils diluted acetic acid for seven days and straining; then heating the colate and washings to boiling to coagulate albuminous matter, and filtering while hot; and when cold adding sufficient diluted acetic acid to make 100 mils.

An ingredient in syrup of squill, 45 m/m.

Expectorant, diuretic. Dose, 1 mil.

ACETUM OPII, N. F. (U. S. P. VIII)—Vinegar of Opium—*Black Drop*

Made from opium, 10 gm.; myristica, No. 30., 3 gm.; sugar, 20 gm.; diluted acetic acid, *q. s.* to make 100 mils.

Contains no narcotine, hence is less nauseating than other preparations of opium.

Sedative. Dose, 0.5 mil.

AQUÆ—WATERS

Origin.—L. *aqua*, water.

Pharmacopœial, 19; U. S. P. VIII, 19; N. F., 1.

The Pharmacopœial waters may be divided into two classes:

I. Non-medicated Waters.
  1. Aqua.
  2. Aqua Destillata.
  3. Aqua Destillata Sterilisata.

II. Medicated Waters, 16 Pharmacopœial.

The medicated waters may be divided into two groups:

I. Chemical Waters.
  1. Aqua Ammoniæ.
  2. Aqua Ammoniæ Fortior.
  3. Aqua Camphoræ.
  4. Aqua Chloroformi.
  5. Aqua Creosoti.

II. Aromatic Waters (Aquæ Aromaticæ).
  1. Aqua Amygdalæ Amaræ.
  2. Aqua Anisi.
  3. Aqua Aurantii Florum.
  4. Aqua Aurantii Florum Fortior.
  (Aqua Camphoræ).
  5. Aqua Cinnamomi.
  6. Aqua Fœniculi.
  7. Aqua Hamamelidis.
  8. Aqua Menthæ Piperitæ.
  9. Aqua Menthæ Viridis.
  10. Aqua Rosæ.
  11. Aqua Rosæ Fortior.

Definition.—*Medicated waters* are solutions of volatile substances in distilled water.

Aromatic waters are solutions of the aromatic principles of plants (volatile oils) in freshly distilled water.

Methods of Preparation:

I. Simple Solution.
  1. Aqua Ammoniæ.
  2. Aqua Ammoniæ Fortior.
  3. Aqua Amygdalæ Amaræ.
  4. Aqua Aurantii.
  5. Aqua Chloroformi.
  6. Aqua Creosoti.
  7. Aqua Rosæ.

II. Distillation.
  1. Aqua Aurantii Florum Fortior.
  2. Aqua Hamamelidis.
  3. Aqua Rosæ Fortior.

III. Filtration through absorbent powder.
  1. Aqua Anisi.
  2. Aqua Camphoræ.
  3. Aqua Cinnamomi.
  4. Aqua Fœniculi.
  5. Aqua Menthæ Piperitæ.
  6. Aqua Menthæ Viridis.

The aromatic waters are usually prepared by this process, and the U. S. P. gives the following general process for their preparation:

Volatile Oil,	2 mils.
Purified Talc,	15 gm.
Distilled Water, recently boiled,	1000 mils.

Triturate the volatile oil with the purified talc, add the recently boiled distilled water gradually with constant trituration, filter, and pass the filtrate through the filter repeatedly until the aromatic water is perfectly clear.

If preferred, the solution of the volatile oil may be made by replacing the purified talc by purified siliceous earth, or by pulped filter-paper; or a solution of the volatile oil may be prepared with recently boiled distilled water by direct addition and filtration, after shaking. Aromatic waters may also be made by the distillation of a mixture of the drug or volatile oil with water. In each case the method used must yield a finished product which meets the official requirements and corresponds with that obtained by the general process.

The purified talc is used to subdivide the oil and facilitate its solution by exposing a greater surface to the solvent action of the water.

Advantages of Class.—The aromatic waters form pleasant vehicles for the administration of medicinal substances.

Incompatibilities.—The waters have all the incompatabilities of aqueous liquids, and, in addition, the aromatic waters are likely to become cloudy when mixed with mineral salts owing to the separation (salting out) of the oil.

Preservation.—The waters should be kept in well filled, closely stoppered bottles in a cool place, as light and air destroy their fragrance. They should not be permitted to freeze, as that would cause the separation of the oil.

Administration.—The aromatic waters are weak medicinally, and are rarely administered to adults except as vehicles for other remedies.

AQUA—Water, H_2O (18.016)—**Aq.**

The purest obtainable natural water. For the purposes specified in the Pharmacopœia water is a colorless, limpid liquid, practically tasteless and odorless, neutral to litmus, containing not more than 0.03 per cent. non-volatile matter, and not exceeding the Pharmacopœial limits in copper, lead, iron, chlorides, nitrates, nitrites, ammonium compounds, and organic impurities.

Water, the best general solvent known, dissolves most inorganic salts, and many organic salts and compounds. It does not modify the therapeutic action of drugs dissolved in it. Its one great disadvantage as a solvent is that it is without antiseptic properties and therefore allows many organic substances, when dissolved in it, to decompose rapidly. When water meeting the Pharmacopœial requirements cannot be obtained, distilled water should be used in its stead.

AQUA AMMONIÆ—Ammonia Water—**Aq. Ammon.**

Contains 9.5 to 10.5 per cent. by weight of NH_3. Sp. gr. 0.958.

Preserve in a cool place in glass-stoppered bottles, made of hard glass free from lead. Deteriorates on keeping; test frequently.

May be prepared by simple solution, mixing 100 gm. of stronger ammonia water with 180 gm. of water. Also prepared by chemical reaction, and passing the ammonia gas into water until the required amount is absorbed.

$$(NH_4)_2SO_4 + Ca(OH)_2 = 2NH_3 + CaSO_4 + 2H_2O$$

Used in preparing ammonia liniment, 25 m/m; aromatic spirit of ammonia, 9 m/m.

Antacid. Dose, 1 mil.

AQUA AMMONIÆ FORTIOR—Stronger Ammonia Water—**Aq. Ammon. Fort.**

Contains 27 to 29 per cent. by weight of NH_3. Sp. gr. 0.897.

Preserve in a cool place in partially filled, strong, glass-stoppered bottles made of hard glass free from lead. Deteriorates on keeping; test frequently. Great caution should be used in handling this liquid; it should not be smelled or tasted.

Prepared commercially as a by-product from the ammoniacal wash water obtained in the purification of the illuminating gas which is prepared by the destructive distillation of coal.

Not used internally.

AQUA AMYGDALÆ AMARÆ—Bitter Almond Water—**Aq. Amygd. Amar.**

Prepared by dissolving 0.1 mil of oil of bitter almond in 99 mils recently boiled distilled water. Contains a trace of hydrocyanic acid.

Vehicle, sedative. Dose, 4 mils.

AQUA ANISI—Anise Water—**Aq. Anisi**

Prepared by the general process for aromatic waters.

AQUA AURANTII FLORUM—Orange Flower Water—**Aq. Aurant. Flor.**

Prepared by mixing equal volumes of stronger orange flower water and recently boiled distilled water.

An ingredient in syrup of orange flowers, about 46 m/m.

A pleasant vehicle and pharmaceutic perfume.

AQUA AURANTII FLORUM FORTIOR—Stronger Orange Flower Water—**Aq. Aurant. Flor. Fort.**

Stronger orange flower water should be free from empyreuma, mustiness, or mucilaginous growths.

Preserve in bottles stoppered with a pledget of purified cotton, in a cool, dark place.

Occurs as a colorless, clear or only faintly opalescent liquid, possessing a strong and pleasant odor and taste of orange blossoms.

Prepared by distilling sufficient fresh orange blossoms with water to saturate the distillate with the oil of orange flowers.

An ingredient in orange flower water, 50 m/m.

Used as a flavor and pharmaceutic perfume; of no therapeutic importance.

AQUA CAMPHORÆ—Camphor Water—**Aq. Camph.**

Prepared by dissolving in a mortar 0.8 gm. camphor in 0.8 mil alcohol; adding 1.5 gm. purified talc and triturating until the alcohol has entirely evaporated; then adding 100 mils recently boiled distilled water, stirring the mixture thoroughly and filtering, passing the filtrate repeatedly through the filter until the camphor water is perfectly clear.

Vehicle, stomachic, carminative. Dose, 10 mils.

AQUA CHLOROFORMI—Chloroform Water—**Aq. Chlorof.**

Prepared by shaking together thoroughly in an amber-colored bottle about 0.5 mil chloroform and 100 mils recently boiled distilled water. A slight excess of chloroform should be maintained in the bottle to insure saturation. Thus prepared it contains about 0.5 per cent. of chloroform.

Antiseptic, vehicle, stomachic, antiemetic. Dose, 15 mils.

AQUA CINNAMOMI—Cinnamon Water—**Aq. Cinnam.**

Prepared by the general process for aromatic waters.

Agreeable vehicle, stomachic, carminative. Dose, 15 mils.

AQUA CREOSOTI—Creosote Water—**Aq. Creosot.**

Prepared by agitating vigorously 1 mil creosote with 99 mils recently boiled distilled water and filtering. It must not be dispensed unless it has been recently prepared.

Antiseptic. Dose, 10 mils.

AQUA DESTILLATA—Distilled Water—**Aq. Dest.**

Prepared by placing 100 volumes of the purest water obtainable in a suitable still provided with a block-tin or glass condenser, and distilling; rejecting the first 10 volumes of distillate containing the dissolved gases; reserving the next 75 volumes as distilled water, collecting it in glass-stoppered bottles which have been rinsed in hot distilled water immediately before being filled. The 15 volumes remaining in the still, containing the mineral impurities of the water, are rejected.

Distilled water when thus prepared is almost absolutely free from impurities.

Used as a solvent in all cases where ordinary water is not of sufficient purity.

AQUA DESTILLATA STERILISATA (IX)—Sterilized Distilled Water—**Aq. Dest. Steril.**

Must be used within forty-eight hours of the time of its preparation.

Prepared by placing the necessary quantity of freshly distilled water in a previously cleansed and sterilized hard glass flask, closing the mouth of the flask with a pledget of sterilized purified cotton, and boiling the water for thirty minutes; cooling without removing the cotton, and finally protecting the mouth of the flask by tying paper tightly over it.

Used in preparing hypodermic solutions and aseptic medicines.

AQUA FŒNICULI—Fennel Water—**Aq. Fœnic.**

Prepared by the general formula for aromatic waters.

Stomachic, carminative; pleasant, mild, aromatic vehicle. Dose, 15 mils.

AQUA HAMAMELIDIS—Hamamelis Water—**Aq. Hamam.**—*Witch Hazel Water; Distilled Extract of Witch Hazel; Witch Hazel*

Hamamelis water contains not less than 14 per cent. of absolute alcohol by volume.

Preserve in tightly closed containers, in a cool place.

Occurs as a clear, colorless, or faintly opalescent or slightly yellowish liquid, having a characteristic odor and taste. Sp. gr. 0.979 to 0.982, and not exceeding the Pharmacopœial limits in metallic and dissolved impurities, formaldehyde, and methyl alcohol.

Prepared by distilling with steam or water the entire witch-hazel shrub, collected in autumn, and adding 15 mils of alcohol to each 85 mils of distillate. The alcohol increases the therapeutic effect and acts also as a preservative.

Used as an embrocation.

AQUA HYDROGENII DIOXIDI, U. S. P. VIII

See *Liquor Hydrogenii Dioxidi*, page 341.

AQUA MENTHÆ PIPERITÆ — Peppermint Water — **Aq. Menth. Pip.**

Prepared by the general process for aromatic waters.

Pleasant vehicle, stomachic. Dose, 15 mils.

AQUA MENTHÆ VIRIDIS—Spearmint Water—**Aq. Menth. Vir.**

Prepared by the general process for aromatic waters.

Pleasant vehicle, stomachic. Dose, 15 mils.

AQUA ROSÆ—Rose Water—**Aq. Ros.**

Prepared by mixing equal volumes of stronger rose water and recently boiled distilled water.

A pleasant vehicle and pharmaceutic perfume.

AQUA ROSÆ FORTIOR—Stronger Rose Water—**Aq. Ros. Fort.**

Stronger rose water should be free from empyreuma, mustiness, or mucilaginous growths.

Preserve in bottles stoppered with a pledget of purified cotton, in a cool, dark place.

Occurs as a colorless, clear liquid, possessing a strong and pleasant odor and taste of fresh rose blossoms.

An ingredient in rose water, 50 m/m, and in ointment of rose water, 19 per cent.

Used as a flavor and pharmaceutic perfume; of no therapeutic importance.

CATAPLASMATA—CATAPLASMS, POULTICES

Origin.—Gr. *kataplassein*, spread over, from *kata*, down + *plassein*, form, shape.

Pharmacopœial, none; U. S. P. VIII, 1; N. F., 1.

Definition.—Cataplasms are soft, pasty preparations for external use.

Method of Preparation.—They are prepared by simple mixture. They all have as base some substance capable of absorbing and retaining considerable liquid, as kaolin in the N. F. IV cataplasm, and linseed meal, ground elm bark, starch, bread, etc., in unofficial ones. They should be soft enough to conform accurately to the surface to which they are applied, yet not soft enough to spread over adjoining surfaces or so tenacious as to adhere firmly to the skin.

Flaxseed poultice is prepared by quickly stirring enough linseed meal into boiling water to produce a soft mush, about 4 ounces of the meal to 10 fluidounces of boiling water.

Advantage of Class.—They afford a convenient means of supplying heat or moisture or both to the affected parts, usually for the purpose of allaying inflammation. They may, however, be medicated so as to act as irritants or counterirritants, as the unofficial mustard poultice. This latter may well be replaced by the mustard plaster, see page 301.

Incompatibilities.—They are rarely prescribed in combination.

Preservation.—Unofficial poultices should be freshly prepared. Cataplasm of kaolin and similar preparations, owing to their hygroscopic nature, should be kept in air-tight containers.

Administration.—Cataplasm of kaolin should be heated on a water-bath; then spread—as hot as can be borne—rather thickly over the affected part and covered with cotton and bandage.

The unofficial poultices, such as flaxseed, bread-and-milk, etc., should be spread rather thickly on a soft cloth, applied as hot as can be borne, and wrapped in woolen to conserve the heat and moisture. They should be changed or reheated as often as the case demands. It is less mussy and for most purposes answers equally well if the poultice is placed in a bag of suitable size, made of cheese-cloth or soft muslin. Greasing the skin that is under the edge of the poultice will prevent it from sticking.

CATAPLASMA KAOLINI, N. F. (U. S. P. VIII)—Cataplasm of Kaolin—Catapl. Kaolin.

Contains kaolin, 56.5 gm.; boric acid, 4.5 gm.; thymol, 0.05 gm.; methyl salicylate, 0.2 gm.; oil of peppermint, 0.05 gm.; glycerin, 38.7 gm., to make 100 gm.

Cataplasm of kaolin is similar to the proprietary articles known as Denver mud, antiphlogistine, etc.

Antiphlogistic. Used externally.

CERATA—CERATES

Origin.—L. *cera*, wax. (The hardening constitutent of cerates.)

Pharmacopœial, 3; U. S. P. VIII, 6; N. F., 3.

Definition.—Cerates are unctuous substances of such consistency that they may be easily spread upon muslin at the ordinary temperature, and yet not so soft as to liquefy when applied to the skin.

Method of Preparation.—Fusion.

Advantage of Class.—They occupy a place midway between the ointments and the plasters. They are not so readily absorbed as the former and their action can be confined more easily to a limited area.

Incompatibilities.—They are rarely prescribed in combination.

Preservation.—They should be kept in glass containers, and the container should always be thoroughly cleansed with s[illegible] and hot water before a new batch is placed therein.

Administration.—They are employed locally an[illegible] spread on muslin before being applied.

CERATUM—Cerate—**Cerat.**—*Simple Cerate*

Prepared by melting on a water-bath 30 gm. white wax; adding 70 gm. benzoinated lard; continuing the heat until liquefied; straining, if necessary; and stirring constantly until it congeals. In warm weather 7 per cent. (or more, if required) of the benzoinated lard may be replaced with an equal weight of the wax.

Used as a protective emollient and as a vehicle in preparing cerates extemporaneously.

CERATUM CAMPHORÆ, N. F. (U. S. P. VIII)—Camphor Cerate—**Cerat. Camph.**

Camphor cerate is prepared by melting together 35 gm. white wax, 15 gm. white petrolatum, and 40 gm. benzoinated lard, and stirring into the cooling liquid 10 gm. of camphor liniment.

Mild stimulating dressing.

CERATUM CANTHARIDIS—Cantharides Cerate—**Cerat. Canthar.**—*Blistering Cerate*

Prepared by melting together 17.5 gm. rosin, 17.5 gm. yellow wax, and 20 gm. benzoinated lard, and straining the mixture through muslin; then adding 35 gm. cantharides, No. 60 powder (which has macerated for forty-eight hours in a mixture of 2.5 mils glacial acetic acid and 15 mils oil of turpentine), maintaining the liquid condition by means of a water-bath; stirring occasionally until it weighs 100 gm., then withdrawing the heat and stirring the cerate until it becomes firm.

An ingredient in cantharides plaster, 0.1 gm. per sq. cm. of plaster.

Rubefacient and vesicant.

CERATUM PLUMBI SUBACETATIS, N. F. (U. S. P. VIII)—Cerate of Lead Subacetate—**Cerat. Plumb. Subacet.**—*Goulard's Cerate*

Prepar [illegible] 20 gm. each, solution of lead subaceta [illegible] 38 gm. white petrolatum and 2 g [illegible]

Soothi [illegible] mmation of the skin.

CERATUM RESINÆ—Rosin Cerate—Cerat. Res.—*Basilicon Ointment*

Prepared by melting 35 gm. rosin, adding 15 gm. yellow wax, and 50 gm. lard; continuing the heat until liquefied, straining through muslin, and stirring occasionally until congealed. In very cold weather 53 gm. of lard and 12 gm. of yellow wax may be used.

An ingredient in turpentine liniment, 65 per cent.

Stimulating, healing.

CERATUM RESINÆ COMPOSITUM, N. F. (U. S. P. VIII)—Compound Rosin Cerate—Cerat. Resin. Co.—*Deshler's Salve*

Prepared by melting together 22.5 gm. each of rosin and yellow wax; 30 gm. prepared suet and 11.5 gm. turpentine; and adding 13.5 gm. linseed oil, straining if necessary.

Stimulating, healing.

CHARTÆ—PAPERS (U. S. P. VIII)

Origin.—L. *carta*, a card, paper.

Pharmacopœial, none; U. S. P. VIII, 1; N. F., 1.

Definition.—Paper treated with medicinal substances.

Method of Preparation.—The prepared medicament is either spread upon the paper or absorbed by the paper, as in the preparation of the unofficial anti-asthmatic papers.

Advantage of Class.—They offer a convenient and inexpensive means for the administration of certain remedial agents.

Incompatibilities.—They are not prescribed in combinations.

Preservation.—They should be kept dry.

Administration.—The paper, placed in a suitable container, is burned and the fumes inhaled, or it may be applied to the skin as a plaster.

CHARTA SINAPIS (U. S. P. VIII)

See *Emplastrum Sinapis*, page 301.

COLLODIA—COLLODIONS

Origin.—Gr. *collodes*, glue-like, from *colla*, glue + *eidos*, form.

Pharmacopœial, 3; U. S. P. VIII, 4; N. F., 5.

Definition.—Collodions are viscid liquid preparations, simple or medicated, having as a base pyroxylin dissolved in a mixture of ether and alcohol.

Method of Preparation.—Simple solution.

Advantage of Class.—Collodions furnish a ready means of restricting the local action of medicinal agents to small areas.

Incompatibilities.—Collodions are incompatible with all aqueous and hydro-alcoholic preparations.

Preservation.—Collodions should be kept in cork-stoppered bottles, in a cool place, remote from lights or fire.

Administration.—Collodions are used externally and are best applied with a soft brush. They are conveniently dispensed in small vials provided with a cork in which a small camel's-hair brush is fastened.

COLLODIUM—Collodion—Collod.

Collodion is inflammable; preserve in well-closed containers, in a cool place, remote from fire.

Occurs as a clear or slightly opalescent, syrupy liquid; sp. gr., 0.765 to 0.775; dries to a transparent film when exposed to the air.

Prepared by placing 4 gm. pyroxylin in a bottle; adding 25 mils alcohol and shaking thoroughly; then adding 75 mils ether; shaking until the pyroxylin has dissolved; then corking the bottle and allowing it to remain quiet; decanting the liquid after it has become clear.

Used extensively in photography.

An ingredient in flexible collodion, 95 per cent.

Protective, vehicle.

COLLODIUM CANTHARIDATUM—Cantharidal Collodion—Collod. Canthar.—*Blistering Collodion; Vesicating Collodion*

Preserve in tightly closed containers, in a cool place, remote from fire.

Prepared by macerating for twenty-four hours 60 gm. powdered cantharides in 55 mils acetone, to which 5 mils glacial acetic acid has been added, then extracting the cantharides by percolation with acetone, reducing the percolate by evaporatio or distillation to 15 gm., cooling, dissolving the extract in gm. flexible collodion, and decanting the clear liquid after several hours.

Epispastic.

COLLODIUM FLEXILE—Flexible Collodion—**Collod. Flex.**

Preserve in tightly closed containers, in a cool place, remote from fire.

Prepared by weighing into a tared bottle 95 gm. collodion, 2 gm. camphor, and 3 gm. castor oil, and shaking until the camphor is dissolved.

Vehicle, protective.

COLLODIUM STYPTICUM, N. F. (Replacing U. S. P. VIII) —Styptic Collodion—**Collod. Stypt.**

Prepared by thoroughly mixing in a bottle 20 gm. tannic acid and 80 gm. flexible collodion.

Styptic, hemostatic.

CONFECTIONES, N. F. (U. S. P. VIII)—CONFECTIONS

Origin.—ML. *confectio*, a preparation.

Pharmacopœial, none; U. S. P. VIII, 2; N. F., 2.

Definition.—Confections are soft, saccharine masses in which one or more medicinal substances are incorporated.

"Conserves" and "Electuaries" are the old terms for confections. Conserves were made from freshly gathered vegetable substances and sugar. Electuaries were made from powdered drugs and syrup or honey.

Method of Preparation.—Incorporation.

Advantage of Class.—Confections afford a very agreeable form for administering medicinal substances.

Incompatibilities.—Rarely experienced.

Preservation.—They should be kept in well-closed glass jars.

Administration.—They are usually eaten or dissolved in the mouth like candy.

CONFECTIO ROSÆ, N. F. (U. S. P. VIII)—Confection of Rose—**Confect. Ros.**

Contains 8 gm. red rose in No. 60 powder; 64 gm. powdered sugar; 12 gm. clarified honey, and 16 mils stronger rose water.

Astringent, vehicle, excipient.

CONFECTIO SENNÆ, N. F. (U. S. P. VIII)—Confection of Senna—**Confect. Senn.**

Contains 10 gm. senna in No. 60 powder; 16 gm. cassia fistula; 10 gm. tamarind pulp; 7 gm. sliced prune; 12 gm. bruised fig; 55.5 gm. powdered sugar; 0.5 gm. oil of coriander, and water to make 100 gm.

Pleasant, mild laxative. Dose, 4 gm.

CORDIALIA, N. F.,—CORDIALS

Origin.—L. *cor*(*d*), heart.

N. F., 1.—Blackberry Cordial.

Definition.—Cordials are liquid preparations which tend to increase the action of the heart and stimulate the circulation. They are sweetened, spiced, alcoholic liquids resembling elixirs, but differing as a class in being rather less sweet and more highly spiced.

DECOCTA—DECOCTIONS

Origin.—L. *de*, down + *coquere*, boil, cook.

Pharmacopœial, none (one general formula); N. F., 1.

Definition.—Decoctions are liquid preparations made by boiling vegetable substances with water.

Method of Preparation.—Decoction.

General Formula for the Preparation of Decoctions

Take of

The drug, coarsely comminuted.......	50 gm.
Water, a sufficient quantity to make...	1000 mils.

Introduce the drug into a suitable container, provided with a cover, pour upon it 1000 mils of cold water, cover it well, and boil for fifteen minutes. Then allow it to cool to about 40° C., express, strain the expressed liquid, and pass enough cold water through the strainer to make the product measure 1000 mils.

Caution.—The strength of decoctions of energetic and poisonous drugs should be specially directed by the physician.

Note.—They should be freshly made from the dru[illegible] made by diluting fluidextracts. No attempt shoul[illegible] to filter decoctions. They are at best cloudy, unsig[illegible] rations and should be dispensed with a "shake" lab[illegible]

Advantage of Class.—They can be easily and quickly prepared and contain no alcohol (they must be freshly prepared).

Incompatibilities.—They are not usually prescribed in combination. Drugs whose active principles are not soluble in water should not be prescribed in the form of decoction.

Preservation.—They should be freshly prepared, and no attempt should be made to preserve them other than to exclude atmospheric dust and to keep them in a cool place.

Administration.—They are weak therapeutic agents and the dose is correspondingly large. They are becoming of less and less importance each year.

ELIXIRIA—ELIXIRS

Origin.—Ar. *el iksir*, the philosopher's stone.

Pharmacopœial, 2; U. S. P. VIII, 3; N. F., 76.

Definition.—Elixirs are aromatic, sweetened, spirituous preparations either with or without medication.

Method of Preparation.—Simple solution.

Advantage of Class.—The object sought in an elixir is an agreeable taste or, at least, a less disagreeable taste.

Incompatibilities.—Elixir of Glycyrrhiza is incompatible with acid preparations. Aromatic elixir has practically no incompatibilities.

Preservation.—They should be kept in well-stoppered bottles in a cool place.

Administration.—The elixirs are designed primarily to impart an agreeable taste to various liquid remedial agents. If concentrated, they may be diluted with a little water at the time of administration.

ELIXIR AROMATICUM — Aromatic Elixir — Elix. Arom.— *Simple Elixir*

Contains about 22 per cent. of alcohol.

Prepared by placing in a 100-mil bottle 1.2 mils compound spirit of orange and enough alcohol to make 25 mils; adding 37.5 mils syrup in several portions, agitating after each addition; adding in the same manner 37.5 mils distilled water; intimately mixing 3 gm. purified talc with the liquid; filtering through a wetted filter; returning the first portions of the filtrate until a transparent liquid is obtained, and washing the filter with a mixture of 1 volume of alcohol and 3 volumes of distilled water to obtain 100 mils of filtrate.

Vehicle.

ELIXIR GLYCYRRHIZÆ—Elixir of Glycyrrhiza—**Elix. Glycyrrh.**—*Elixir Adjuvans*, U. S. P. VIII; *Elixir of Licorice*

Contains about 22 per cent. of alcohol.

Prepared by mixing 12.5 mils fluidextract of glycyrrhiza with 87.5 mils aromatic elixir and filtering.

Vehicle.

ELIXIR FERRI, QUININÆ ET STRYCHNINÆ, PHOSPHATUM, U. S. P. VIII

Elixir of the phosphates of iron, quinine, and strychnine contained the three phosphates in nearly neutral solution. The iron phosphate was held in solution by ammonium acetate. Contained 70 mg. soluble ferric phosphate and the equivalent of 38 mg. quinine and of 1.1 mg. strychnine in each dose.

Tonic. Dose, 4 mils.

EMPLASTRA—PLASTERS

Origin.—Gr. *emplassein*, to plaster up.

Pharmacopœial, 7; U. S. P. VIII, 7; N. F., 2.

Definition.—The Pharmacopœial plasters are of two kinds: plaster masses and spread plasters.

Plaster masses are solid substances intended for external application, adhesive at the temperature of the human body, and require softening with heat before they can be spread upon cloth or muslin. Example: Emplastrum Resinæ.

Spread plasters are pieces of muslin or other suitable material coated on one side with plaster mass and ready for application.

The Pharmacopœial plasters, with the exception of Emplastrum Belladonnæ, Emplastrum Plumbi, and Em[illegible] [illegible]næ, may be considered as spread plasters.

Methods of Preparation.—I. Fusion and Incorporation: Emplastrum Resinæ. II. Chemical Reaction: Emplastrum Plumbi. III. Spreading of medicament over suitable material: Emplastrum Capsici, Emplastrum Cantharidis; paper or cloth, Emplastrum Sinapis. IV. Factory prepared: Emplastrum Belladonnæ, Emplastrum Elasticum.

Advantage of Class.—Plasters can be made to serve the double purpose of support and medication to the parts to which they are applied.

Incompatibilities.—Rarely experienced with plasters.

Preservation.—Plaster masses should be kept in rolls closely wrapped in waxed paper or tin-foil to protect them from the air. When not so protected they soon become hard and brittle and can no longer be spread satisfactorily.

Administration.—They are spread on thin muslin, thin leather, or similar material of suitable size and shape, and applied to the carefully cleansed area. Hairy surfaces should be shaved, otherwise the removal of the plaster will be very painful. In cold weather it is advisable to warm them slightly before application.

Kinds of Spread Plasters

Adhesive Plaster.—Non-medicated spread plaster intended as a supporting agent.

Porous Plaster.—Spread plasters pierced with numerous small holes to prevent wrinkling or to render them more pliable, and also less irritating by providing means of escape for the secretions of the skin.

Plaster Mull.—A plaster made by coating a thin sheet of gutta-percha, backed with muslin, with the substance that is to be applied to the skin.

Directions for Spreading Plasters.—Cut in a piece of stiff glazed paper a hole of the size and shape of the plaster required. Place this pattern over the muslin, thin leather, or other substance on which the plaster is to be spread, and fasten them down securely on a smooth board with thumb-tacks. Soften the required amount of plaster in a small dish on a water-bath, and when sufficiently softened spread it evenly with a warmed spatula over the surface within the pattern. The mass should be warm enough to spread easily, but not liquid enough to penetrate the supporting material. In smoothing the surface of the plaster work toward the center so as not to force the mass under the edges of the pattern. When the plaster has set, pass the warmed tip of the spatula around the edge close to the pattern so that the latter will separate easily. Remove the pattern and trim neatly the edge of the plaster, leaving a free border of about 1 cm. Protect the surface with a piece of cheesecloth.

EMPLASTRUM BELLADONNÆ—Belladonna Plaster—Emp. Bellad.

An adhesive plaster containing 30 per cent. of extract of belladonna leaves and yielding upon assay 0.35 to 0.40 per cent. of the alkaloids of belladonna leaves.

EMPLASTRUM CANTHARIDIS (IX)—Cantharides Plaster—Emp. Canthar.

Prepared by spreading cantharides cerate to the amount of 10 gm. per 100 sq. cm. over the surface of rosin plaster which has been previously spread on fabric. It should not be dispensed unless it has been recently prepared.

The plaster of proper size is usually moistened with olive oil, brandy, or vinegar before being applied.

Vesicant.

EMPLASTRUM CAPSICI—Capsicum Plaster—Emp. Capsic.

Contains 1.67 gm. of oleoresin of capsicum to each 100 sq. cm.

Prepared by applying oleoresin of capsicum to the surface of rubber plaster so as to form a thin, even coating, leaving a margin around the edges.

Rubefacient.

EMPLASTRUM ELASTICUM (IX)—Rubber Plaster—Emp. Elast.—*Rubber Adhesive Plaster*

A commercially prepared plaster consisting of [illegible] rubber, resins and waxes, with a filler of an [illegible] such as orris root or starch, mechanically mixed and spread upon cotton cloth or other fabric.

Mildly stimulating, support.

EMPLASTRUM PLUMBI—Lead Plaster—Emp. Plumb.—

Diachylon Plaster

Prepared by melting together in a suitable vessel by gentle heat 100 gm. each lard and olive oil, sifting on the surface of the liquid 100 gm. lead oxide through a No. 80 sieve, mixing thoroughly; gradually adding 35 mils boiling water and boiling the mixture, constantly stirring with a wooden spatula (adding boiling water from time to time to replace that lost by evaporation) until the mass is homogeneous and a small portion, when removed and dipped in cold water, is found to be pliable and tenacious. The mass is then removed from the fire and washed several times with warm water to remove glycerin formed in the reaction; kneaded until free from water, and then rolled into cylinders of suitable size and wrapped in paper.

Chemical Reaction:

$$2C_3H_5(C_{18}H_{33}O_2)_3 + 3PbO + 3H_2O = 3Pb(C_{18}H_{33}O_2)_2 + 2C_3H_5(OH)_3$$

Protective, sedative.

EMPLASTRUM RESINÆ (IX)—Rosin Plaster—Emp. Res.—

Rosin Adhesive Plaster; Adhesive Plaster

Prepared by melting together at a gentle heat 80 gm. lead plaster and 6 gm. yellow wax, then adding 14 gm. rosin, mixing thoroughly, straining the melted liquid, and stirring until it stiffens.

Support and bandaging medium.

EMPLASTRUM SAPONIS, N. F. (U. S. P. VIII)—Soap Plaster—Emp. Sapon.

Prepared by rubbing 10 gm. of dry soap powder to a pas with water, incorporating it with 90 gm. of melted lead plas and evaporating the mixture to 100 gm.

Discutient.

EMPLASTRUM SINAPIS—Mustard Plaster—**Emp. Sinap.**—*Charta Sinapis*, U. S. P. VIII; *Mustard Paper; Mustard Leaves*

Contains not less than 2.5 gm. of black mustard deprived of its oil per each 100 sq. cm., and when moistened thoroughly with tepid water and applied to the skin should produce a decided warmth and reddening of the skin within five minutes. Preserve in tightly closed containers.

Prepared by spreading a uniform mixture of the prepared mustard and solution of rubber on paper, cotton, cloth, or other fabric.

Mustard paper should be thoroughly moistened with tepid water before it is applied.

Rubefacient, counterirritant.

EMULSA—EMULSIONS

Origin.—L. *e*, out + *mulgere*, milk.

Pharmacopœial, 4; U. S. P. VIII, 6; N. F., 8.

Definition.—Emulsions are milky appearing liquids for internal use, consisting of oleaginous or resinous substances suspended in water by the aid of gum or other viscid substances.

Methods of Preparation.—I. By trituration: Emulsum Amygdalæ, Emulsum Asafœtidæ, Emulsum Olei Morrhuæ. II. By shaking the ingredients in a bottle: Emulsum Chloroformi.

Two methods of combining the ingredients are commonly recognized, the English Method and the Continental Method.

English Method.—Liquid emulsifying principles are used in this process. The proper amount of mucilage is placed in a mortar or suitable vessel and the oil, in divided portions, is added to the mucilage with constant agitation. Each portion of the oil is thoroughly emulsified before the succeeding portion is added. As the emulsion thickens with the addition of oil it will be necessary to add from time to time small portions of water. The emulsion thus prepared is known as the primary emulsion. To it may be added as required more water, dilute salt [illegible] flavoring, etc. From 55 to 65 parts of [illegible] o emulsify 100 parts by volume [illegible]

[illegible] ered emulsifying principles are used in this process. It has the advantage of rarely failing to produce a satisfactory emulsion with a minimum amount of labor. The Pharmacopœial oil emulsions are prepared by this process. The following proportions are recommended: Gum (powdered acacia), 1 part; water, 1½ or 2 parts; fixed oil, 4 parts. Triturate the gum with the oil in a dry mortar, having a capacity of about three times the volume of the finished emulsion, until intimately mixed, and then add without delay and all at once the water, and triturate rapidly until a soft creamy emulsion results. The emulsion thus produced is called the "nucleus." More water, dilute salt solutions, syrup, flavor, etc., may now be incorporated without fear of causing the oil to separate from the emulsion ("cracking" or "splitting").

Caution.—The water should never be measured in an oily graduate.

Volatile substances require about double the amount of emulsifying agent that is required by fixed oils and they are best emulsified in closed containers (bottles). These emulsions are rendered more stable or permanent by emulsifying the volatile substance in conjunction with from one to two times its volume of expressed oil of almond. The proportion of emulsifying agent to be used is the sum of that required to emulsify each separately.

Advantage of Class.—They are easily assimilated and digested. They also afford a convenient and more or less satisfactory means of administering substances which have a disagreeable taste.

Incompatibilities.—They are incompatible with acids, alkalies, and strong alcoholic solutions, as these substances tend to precipitate the emulsifying agent. Salts, glycerin, and sugar also tend to produce separation of the oil unless they are added in quite dilute aqueous solution.

Preservation.—They should be freshly prepared and should be kept closely stoppered.

Administration.—They are especially prepared for administration. They should be dispensed with a "shake label."

Classification.—They are divided into natural and artificial emulsions.

Natural emulsions are milk, milky juices of plants, yolk of egg, etc. They are of little importance pharmaceutically.

Artificial emulsions are those prepared by the pharmacist and are divided into: I, Seed Emulsions (Emulsum Amygdalæ); II, Gum-resin Emulsions (Emulsum Asafœtidæ), and III, Oil Emulsions (Emulsum Olei Morrhuæ). The first two usually require no special emulsifying agent, although occasionally a little gum is added to secure greater stability.

Emulsifying agents are classified into three groups: I, Albuminous; II, Gummy or Mucilaginous, and III, Saponaceous.

TABLE OF EMULSIFYING AGENTS

For 100 parts of fixed oil or 50 parts of volatile oil to produce the primary emulsion or nucleus use:

Parts.	Emulsifying agent.	Water.	Classification of emulsifying agent. Group.
25	Acacia	35–50	II
100	Casein, saccharated (10 per cent.)	35	I
1.3	Chondrus gelatin	64	II
65	Chondrus mucilage	None	II
50	Condensed milk	None	I
22	Dextrin (white)	44	II
65	Dextrin mucilage	None	II
50	Egg yolk	None	I
35	Gly. of egg yolk	None	I
100	Malt extract	None	II
25	Pancreatin and Sod. bicarb. (equal parts)	50	I
10	Quillaja Tr. (20 per cent.)	None	III
1 to 5	Tragacanth	25–50	II

EMULSUM AMYGDALÆ — Emulsion of Almond — Emuls. Amygd.—*Milk of Almond*

Must not be dispensed unless recently prepared.

Prepared by beating together in a mortar 6 gm. blanched almonds, 1 gm. powdered acacia, and 3 gm. sugar, and triturating the mass with 90 mils of water, gradually added, until a uniform mixture results. Then straining the mixture into a graduated receiver, washing the mortar and strainer with enough water to make 100 mils.

Agreeable, nutritive demulcent. Dose, 120 mils.

EMULSUM ASAFŒTIDÆ—Emulsion of Asafetida—Emuls. Asafœt.—*Milk of Asafetida*

Prepared by triturating in a mortar 4 gm. asafetida and 90 mils water, at first gradually added until a uniform mixture results; then straining the mixture into a graduated receiver and washing the mortar and strainer with enough water to make 100 mils. This emulsion sometimes turns pink due to the oxidation of some constituent in it.

Often used as an enema, carminative, antispasmodic. Dose, 15 mils.

EMULSUM CHLOROFORMI (U. S. P. VIII)

Chloroform emulsion is prepared in a bottle using 4 c.c. chloroform and 6 c.c. expressed oil of almond, 1 gm. powdered tragacanth, and water enough to make 100 c.c.

Stomachic, antemetic. Dose, 8 mils.

EMULSUM OLEI MORRHUÆ—Emulsion of Cod Liver Oil—Emuls. Ol. Morrh.

Prepared by triturating together in a dry mortar 50 mils cod liver oil and 12.5 gm. powdered acacia, then adding at once 25 mils of water, and completing the nucleus by triturating rapidly; then adding 0.4 mil methyl salicylate, 10 mils syrup, and enough water to make 100 mils, mixing thoroughly. The methyl salicylate may be replaced by a suitable quantity of any other flavoring.

Nutrient. Dose, 15 mils.

EMULSUM OLEI MORRHUÆ CUM HYPOPHOSPHITIBUS, N. F. (U. S. P. VIII)—Emulsion of Cod Liver Oil with Hypophosphites—Emul. Ol. Morrh. c. Hypophos.

Prepared in a mortar, using 50 mils cod liver oil, 12.5 gm. powdered acacia, 1 gm. calcium hypophosphite, 0.5 gm. each potassium and sodium hypophosphites, 10 mils syrup, 0.4 mil oil of gaultheria or other flavor in suitable quantity, and water enough to make 100 mils.

Tonic, nervine, reconstructive. Dose, 8 mils.

EMULSUM OLEI TEREBINTHINÆ—Emulsion of Oil of Turpentine—**Emuls. Ol. Tereb.**

Prepared by shaking thoroughly in a perfectly dry bottle 15 gm. powdered acacia, 5 mils expressed oil of almond, and 15 mils rectified oil of turpentine, then adding about 30 mils of water, again shaking, and finally, in divided portions, shaking after each addition, 25 mils syrup, and water enough to make 100 mils.

Carminative. Dose, 2 mils.

EXTRACTA—EXTRACTS

Origin.—L, *ex*, out + *trahere*, draw, to draw out.

Pharmacopœial, 25; U. S. P. VIII, 28; N. F., 13.

The Pharmacopœial extracts may be divided into two classes:

I. Pilular Extracts:

1. Extractum Belladonnæ Foliorum.
2. Extractum Cannabis.
3. Extractum Ergotæ.
4. Extractum Gentianæ.
5. Extractum Glycyrrhizæ Purum.
6. Extractum Hyoscyami.
7. Extractum Malti.
8. Extractum Stramonii.
9. Extractum Sumbul.
10. Extractum Taraxaci.

II. Powdered Extracts:

1. Extractum Aconiti.
2. Extractum Belladonnæ Foliorum.
3. Extractum Cascaræ Sagradæ.
4. Extractum Cimicifugæ.
5. Extractum Colchici Cormi.
6. Extractum Colocynthidis.
7. Extractum Colocynthidis Compositum.
8. Extractum Fellis Bovis.
9. Extractum Gelsemii.
10. Extractum Glycyrrhizæ.
11. Extractum Hydrastis.
12. Extractum Nucis Vomicæ.
13. Extractum Opii.
14. Extractum Physostigmatis.
15. Extractum Rhei.
16. Extractum Stramonii.
17. Extractum Viburni Prunifolii.

Definition.—In general, extracts are solid or semisolid products obtained by evaporating solutions of the medicinal principles of vegetable drugs.

Pilular extracts are solid or semisolid products prepared by exhausting drugs with appropriate solvents and carefully evaporating these solutions to the proper consistency.

Powdered extracts differ from pilular extracts in that they are dry, fine powders.

Methods of Preparation.—I. By evaporating a specially prepared solution of the active constituents of the drug.

I (A). Evaporation of an alcoholic solution:

1. **Extractum Aconiti.**
2. **Extractum Belladonnæ Foliorum (powd.).**
3. **Extractum Cannabis.**
4. **Extractum Cimicifugæ.**
5. **Extractum Colchici Cormi.**
6. **Extractum Fellis Bovis.**
7. **Extractum Gelsemii.**
8. **Extractum Hydrastis.**
9. **Extractum Stramonii (powd.).**

I (B). Evaporation of a hydro-alcoholic solution:

1. **Extractum Belladonnæ Foliorum (pilular).**
2. **Extractum Colocynthidis.**
3. **Extractum Ergotæ.**
4. **Extractum Hyoscyami.**
5. **Extractum Nucis Vomicæ.**
6. **Extractum Physostigmatis.**
7. **Extractum Rhei.**
8. **Extractum Stramonii (pilular).**
9. **Extractum Sumbul.**
10. **Extractum Taraxaci.**
11. **Extractum Viburnum Prunifolii.**

I (C). Evaporation of a water solution:

1. **Extractum Cascaræ Sagradæ.**
2. **Extractum Gentianæ.**
3. **Extractum Glycyrrhizæ.**
4. **Extractum Glycyrrhizæ Purum.**
5. **Extractum Malti.**
6. **Extractum Opii.**

II. By admixture.

Extractum Colocynthidis Compositum.

In concentrating the solutions, Method I, the temperature stated in the formula for the evaporation should not be exceeded. The operation should be conducted without delay and undue exposure to heat. Frequent stirring hastens the evaporation and insures a uniform product.

When necessary to reduce the extracts to the required standard or to preserve their consistency, inert diluents are used. The U. S. P. IX directs the use of glucose in pilular extracts and dried starch and magnesium oxide in powdered extracts, but permits the use of sugar, sugar of milk, powdered glycyrrhiza, magnesium carbonate, the finely powdered drug, and marc from which the respective extract is made.

A few drugs require the addition of an acid or an alkali to the menstruum for the proper extraction and preservation of their active principles. For example, tartaric acid is used for aconite, hydrastis, and physostigma; and hydrochloric acid for ergot. Ammonia water is used for glycyrrhiza.

Other drugs contain oily or fatty matters which it is desirable to remove. This is done by washing with purified benzin. Ergot is washed by percolating with purified benzin previous *to extraction,* but in the case of aconite, colchicum corm, nux vomica, and physostigma the percolate is washed after it has been concentrated to small bulk.

Advantage of Class.—Extracts preserve the useful constituents of the drug in a concentrated, relatively uniform and permanent condition, in a form suitable for administration, and free from cellular matter which might irritate the stomach or retard therapeutic action.

Powdered extracts are often preferred to pilular extracts for general use because of the ease with which they may be weighed, dispensed, and preserved in tightly stoppered bottles.

Incompatibilities are rarely experienced. Being vegetable, they should not be combined with strong oxidizing agents, like potassium permanganate, silver oxide or nitrate.

Preservation.—Pilular extracts should be kept in amber-colored glass or in earthenware containers, closely covered, in a cool place.

Powdered extracts should be kept in small, amber-colored, wide-mouth bottles, in a cool, dry place.

Administration.—Extracts are suitable for administration in any of the various forms of solid or semisolid medicaments. Pilular extracts are extensively used in pills, masses, and ointments.

EXTRACTUM ACONITI (IX)—Extract of Aconite—Ext. Aconit.—*Powdered Extract of Aconite*

A powdered tartaro-alcohol, benzin-washed extract containing 1.8 to 2.2 per cent. of ether-soluble alkaloids. Approximately four times as potent as aconite.

Biological assay, M.L.D., not greater than 0.00001 gm. per gramme body weight of guinea-pig.

Cardiac depressant. Dose, 10 mg.

EXTRACTUM ALOES, N. F. (U. S. P. VIII)—Extract of Aloes —Ext. Aloes—*Powdered Extract of Aloes*

Prepared by extracting 100 gm. aloes with 1000 mils of boiling water, evaporating the clear [illegible] mixing the powdered residue with [illegible]

Cathartic. Dose, 125 [illegible]

EXTRACTUM BELLADONNÆ FOLIORUM—Extract of Belladonna Leaves—**Ext. Bellad. Fol.**

Either a pilular hydro-alcoholic extract or a powdered alcohol extract containing 1.18 to 1.32 per cent. of alkaloids. Approximately four times as potent as belladonna leaves.

An ingredient in belladonna ointment, 10 per cent. pilular extract, and in belladonna plaster, 30 per cent.

Circulatory and respiratory stimulant. Antisecretory, local anodyne. Dose, 15 mg.

EXTRACTUM CANNABIS — Extract of Cannabis — **Ext. Cannab.**

A pilular, alcohol extract capable of producing incoördination when administered in the proportion of 0.004 gm. of extract per kilogram body weight of dog.

Analgesic, narcotic. Dose, 10 mg.

EXTRACTUM CASCARÆ SAGRADÆ—Extract of Cascara Sagrada—**Ext. Cascar. Sagr.**—*Extractum Rhamni Purshianæ*, U. S. P. VIII; *Powdered Extract of Cascara Sagrada*

A powdered water extract three times as potent as cascara sagrada.

Tonic, laxative. Dose, 250 mg.

EXTRACTUM CIMICIFUGÆ—Extract of Cimicifuga—**Ext. Cimicif.**—*Powdered Extract of Cimicifuga*

A powdered alcohol extract four times as potent as cimicifuga.

Antispasmodic. Dose, 250 mg.

EXTRACTUM COLCHICI CORMI—Extract of Colchicum Corm—**Ext. Colch. Corm.**—*Powdered Extract of Colchicum Corm*

A powdered alcohol, benzin-washed extract containing 1.25 to 1.55 per cent. of colchicine. Approximately four times as potent as colchicum corm.

Alterative in gout. Dose, 60 mg.

EXTRACTUM COLOCYNTHIDIS—Extract of Colocynth—**Ext. Colocynth.**—*Powdered Extract of Colocynth*

A powdered, diluted alcohol extract four times as potent as colocynth.

An ingredient in compound extract of colocynth, 16 per cent.
Drastic cathartic. Dose, 30 mg.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM—Compound Extract of Colocynth—**Ext. Colocynth. Co.**—*Powdered Compound Extract of Colocynth*

A powdered extract containing 16 gm. extract colocynth, 50 gm. aloes, 5 gm. cardamom seed, 14 gm. resin of scammony, and 15 gm. soap.
An ingredient in compound cathartic pills, 8 g/n.
Cathartic. Dose, 250 mg.

EXTRACTUM DIGITALIS (U. S. P. VIII)

Extract of digitalis, an unstandardized pilular extract obtained by evaporating fluidextract of digitalis.
Heart stimulant, diuretic. Dose, 10 mg.

EXTRACTUM ERGOTÆ—Extract of Ergot—**Ext. Ergot.**

An unstandardized pilular, tartaro-hydro-alcohol, benzin-washed extract.
Uterine hemostatic. Dose, 250 mg.

EXTRACTUM EUONYMI, N. F. (U. S. P. VIII)—Extract of Euonymus—**Ext. Euonymi**—*Powdered Extract of Euonymus*

A powdered extract obtained by evaporating a hydro-alcoholic (A. 4, W. 1) tincture of euonymus and mixing the powdered residue with enough dry starch to make the weight one-fourth that of the euonymus.
Purgative. Dose, 125 mg.

EXTRACTUM FELLIS BOVIS (IX)—Extract of Oxgall—**Ext. Fel. Bov.**—*Powdered Extract of Oxgall*

A powdered alcohol extract eight times as potent as oxgall.
Cholagogue, purgative. Dose, 100 mg.

EXTRACTUM GELSEMII (IX)—Extract of Gelsemium—**Ext. Gelsem.**—*Powdered Extract of Gelsemium*

A powdered al [illegible] otent as gelsemium.
Anti [illegible]

EXTRACTUM GENTIANÆ—Extract of Gentian—**Ext. Gentian.**

A pilular water extract.

Bitter stomachic. Dose, 250 mg.

EXTRACTUM GLYCYRRHIZÆ—Extract of Glycyrrhiza—**Ext. Glycyrrh.**—*Extract of Licorice*

A commercial extract containing 60 per cent. of water-soluble extract.

Occurs in glossy black flattened cylindric rolls or masses; fracture sharp, smooth, conchoidal; characteristic odor; characteristic sweet taste.

Generally prepared by evaporating a decoction of licorice root.

An ingredient in troches of ammonium chloride, 20 g/n, and in troches of cubeb, 25 g/n.

Demulcent, sweetening agent. Dose, 1 gm.

EXTRACTUM GLYCYRRHIZÆ PURUM—Pure Extract of Glycyrrhiza—**Ext. Glycyrrh. Pur.**

An unstandardized, pilular, ammoniacal chloroform water extract.

An ingredient in compound mixture of glycyrrhiza, 3 g/m.

Demulcent, sweetening agent. Dose, 1 gm.

EXTRACTUM HÆMATOXYLI, N. F. (U. S. P. VIII)—Extract of Hematoxylon—**Ext. Hæmatox.**

A dry, unstandardized water extract.

Astringent. Dose, 1 gm.

EXTRACTUM HYDRASTIS (IX)—Extract of Hydrastis—**Ext. Hydrast.**—*Extract of Golden Seal; Powdered Extract of Hydrastis*

A powdered, tartaro-alcohol extract containing 9 to 11 per cent. of ether-soluble alkaloids. Approximately four times as potent as hydrastis.

Bitter tonic, alterative. Dose, 0.5 gm.

EXTRACTUM HYOSCYAMI—Extract of Hyoscyamus—**Ext. Hyosc.**

A pilular, hydro-alcohol extract containing 0.22 to 0.28 per cent. of alkaloids. Approximately four times as potent as hyoscyamus.

Hypnotic, antispasmodic. Dose, 60 mg.

EXTRACTUM KRAMERIÆ, N. F. (U. S. P. VIII)—Extract of Krameria—**Ext. Kramer.**—*Powdered Extract of Krameria*

A powdered water extract containing sufficient dry starch to make its weight one-fourth that of the krameria.

Astringent. Dose, 0.5 gm.

EXTRACTUM LEPTANDRÆ, N. F. (U. S. P. VIII)—Extract of Leptandra—**Ext. Leptand.**—*Powdered Extract of Leptandra*

A powdered extract four times as potent as leptandra, obtained by evaporating a hydro-alcoholic (A. 3, W. 1) tincture of leptandra to dryness and adding sufficient dry starch to the powdered residue.

Cholagogue, cathartic. Dose, 250 mg.

EXTRACTUM MALTI—Extract of Malt—**Ext. Malt.**

An unstandardized, syrupy liquid (sp. gv., 1.35 to 1.40), water extract of malt.

Demulcent, nutritive. Dose, 15 gm.

EXTRACTUM NUCIS VOMICÆ—Extract of Nux Vomica—**Ext. Nuc. Vom.**—*Powdered Extract of Nux Vomica*

A powdered, hydro-alcohol, benzin-washed extract containing 15.2 to 16.8 per cent. of alkaloids. Approximately six times as potent as nux vomica.

Stomachic, motor excitant, circulatory, and respiratory stimulant. Dose, 15 mg.

EXTRACTUM OPII—Extract of Opium—**Ext. Opii**—*Powdered Extract of Opium*

A powdered water extract containing 19.5 to 20.5 per cent. of morphine. Approximately twice as potent as opium.

Anodyne, sedative, antidiarrheal. Dose, 30 mg.

EXTRACTUM PHYSOSTIGMATIS—Extract of Physostigma —**Ext. Physostig.**—*Powdered Extract of Physostigma*

A powdered, tartaro-hydro-alcohol, benzin-washed extract containing 1.7 to 2.3 per cent. of alkaloids, approximately thirteen times as potent as physostigma

Motor depressant. Dose, 8 mg.

EXTRACTUM QUASSIÆ, N. F. (U. S. P. VIII)—Extract of Quassia—**Ext. Quas.**—*Powdered Extract of Quassia*

A powdered water extract ten times as potent as quassia.

Bitter stomachic. Dose, 60 mg.

EXTRACTUM RHAMNI PURSHIANÆ

See *Extractum Cascaræ Sagradæ*, page 308.

EXTRACTUM RHEI—Extract of Rhubarb—**Ext. Rhei**—*Powdered Extract of Rhubarb*

A powdered hydro-alcohol extract two times as potent as rhubarb.

Purgative, astringent, stomachic. Dose, 250 mg.

EXTRACTUM SCOPOLÆ, U. S. P. VIII

Extract of scopola was a powdered extract containing 2 per cent. of mydriatic alkaloids, approximately four times as potent as scopola, prepared by evaporating the fluidextract of scopola.

Hypnotic, antispasmodic. Dose, 10 mg.

EXTRACTUM STRAMONII—Extract of Stramonium—**Ext. Stramon.**

Either a pilular hydro-alcohol extract or a powdered alcohol extract containing 0.9 to 1.1 per cent. of alkaloids. Approximately four times as potent as stramonium.

An ingredient in stramonium ointment, 10 per cent. (pilular extract).

Circulatory and respiratory stimulant, local anodyne. Dose, *10 mg.*

EXTRACTUM SUMBUL—Extract of Sumbul—**Ext. Sumbul**

An unstandardized, pilular hydro-alcohol extract.
Antispasmodic. Dose, 250 mg.

EXTRACTUM TARAXACI—Extract of Taraxacum—**Ext. Tarax.**

An unstandardized, pilular hydro-alcohol extract.
Stomachic, mild laxative, diuretic. Dose, 1 gm.

EXTRACTUM VIBURNI PRUNIFOLII (IX)—Extract of Viburnum Prunifolium—**Ext. Viburn. Prun.**—*Powdered Extract of Viburnum Prunifolium*

A powdered diluted alcohol extract five times as potent as viburnum prunifolium.
Antispasmodic, especially in uterine colic. Dose, 0.5 gm.

FLUIDEXTRACTA—FLUIDEXTRACTS

Origin.—L. *fluidus*, fluid *extrahere*, to draw out.

Pharmacopœial, 49; U. S. P. VIII, 85; N. F., 90.

Definition.—Fluidextracts are concentrated liquid preparations of vegetable drugs containing alcohol either as a solvent or as a preservative, and bearing a uniform relation to the drug used, so that 1 mil of the fluidextract approximately represents the potency of 1 gramme of the air-dried, powdered drug of standard quality.

Method of Preparation.—They are prepared by percolation and partial evaporation (repercolation is also officially recommended), with the exception of two, squill and wild cherry, which are prepared by percolation, without evaporation. With few exceptions, they may be classified according to the menstrua used in the extraction of the drugs and the processes of manufacture employed. Several drugs require special manipulation to obtain satisfactory fluidextracts, and for these appropriate formulas have been devised and are printed in full in the te of the U. S. P. The following type processes are described, and in each formula the process to be used nated by reference to the type process:

"**Type Process A.**—In this class are included those fluidextracts that are made with a mestruum of alcohol or a mixture of alcohol and water by the usual process of percolation."

"**Type Process B.**—In this class are included those fluidextracts in which glycerin or an acid is used in the extraction and two menstrua are successively employed. Menstruum I contains the glycerin or acid in definite proportion to the amount of the drug, and Menstruum II, a mixture of alcohol and water intended for completing the exhaustion of the drug."

"**Type Process C.**—The process of fractional or divided percolation. This is especially recommended for drugs containing volatile ingredients or constitutents injured by exposure to heat. This process may likewise be used as an alternative process in the formulas in which Type Process A is directed."

"**Type Process D.**—In this class are included those fluidextracts in which extraction is effected by infusion and percolation with boiling water, alcohol being added to the concentrated liquid as a preservative.

In the preparation of fluidextracts by either Process A, B, or C the rate of percolation must be carefully controlled and, for the quantities directed in the formulas of the Pharmacopæia, the flow should not exceed 10 drops per minute until the reserved percolate is collected, and 20 drops per minute thereafter." With careful percolation most drugs will be exhausted when the percolate from each 1000 grammes of drug measures 3000 mils.

"**Type Process A.**—Moisten 1000 gm. of the powdered drug directed with a sufficient quantity of the prescribed menstruum to render it evenly and distinctly damp and to maintain it so after macerating for six hours in a tightly covered container. Then pack it in a cylindrical percolator and add enough of the menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice and, having closely covered the percolator, macerate for forty-eight hours. Then allow the percolation to proceed slowly, gradually adding more menstruum, until the drug is exhausted. Reserve the first 850 mils of the percolate (unless otherwise specified in the formula); recover the alcohol from the remainder and concentrate the residue to a soft extract at a temperature not exceeding 60° C.; dissolve this in the reserved portion, mix thoroughly, and finally add a sufficient quantity of the menstruum to obtain 1000 mils, or the volume *determined by* calculation from the assay."

FLUIDEXTRACTS PREPARED BY PROCESS A, 28

Menstruum, alcohol, 7.

Fldext. Buchu.
Fldext. Cannabis.
Fldext. Cimicifugæ.
Fldext. Podophylli.
Fldext. Staphisagriæ.
Fldext. Veratri Viridis.
Fldext. Zingiberis.

Menstruum, alcohol 5 volumes, water 1 volume, 2.

Fldext. Belladonnæ Radicis.
Fldext. Digitalis.

Menstruum, alcohol 4 volumes, water 1 volume, 5.

Fldext. Eriodictyi.
Fldext. Gelsemii.
Fldext. Rhei.
Fldext. Sabal.
Fldext. Sumbul.

Menstruum, alcohol 3 volumes, water 1 volume, 6.

Fldext. Eucalypti.
Fldext. Grindeliæ.
Fldext. Guaranæ.
Fldext. Hyoscyami.
Fldext. Nucis Vomicæ.
Fldext. Xanthoxyli.

Menstruum, alcohol 2 volumes, water 1 volume, 3.

Fldext. Colchici Seminis.
Fldext. Pilocarpi.
Fldext. Viburni Prunifolii.

Menstruum, diluted alcohol, 4.

Fldext. Gentianæ.
Fldext. Sarsaparillæ.
Fldext. Spigeliæ.
Fldext. Stillingiæ.

Menstruum, alcohol 1 volume, water 2 volumes, 1.

Fldext. Sennæ.

"**Type Process B.**—Moisten 1000 gm. of the powdered drug directed with a sufficient quantity of the prescribed Menstruum I to render it evenly and distinctly damp and to maintain it so after macerating for six hours in a tightly covered container. Then pack it in a cylindrical percolator, add the remainder of Menstruum I, and, when this has just disappeared from the surface, gradually add Menstruum II, constantly maintaining a stratum of liquid above the drug. When the liquid begins to drop from the percolator, close the lower or
fice, and, having closely covered the percolator, macera
forty-eight hours, and then allow the percolation to
slowly, gradually adding Menstruum II until the dru
hausted. Reserve the first 850 mils of the percolate
otherwise specified in the formula); recover the alcoh

the remainder and concentrate the residue to a soft extract at a temperature not exceeding 60° C.; dissolve this in the reserved portion, mix thoroughly, and finally add a sufficient quantity of Menstruum II to obtain 1000 mils, or the volume determined by calculation from the assay."

FLUIDEXTRACTS PREPARED BY PROCESS B, 11

Menstruum containing glycerin, 7 plus 1 in the next group.

Fluidextractum.	Menstruum I.	Menstruum II.
Aspidospermatis	G 110, A 670, W 220	A 2, W 1
Granati	G 100, A 500, W 400	Diluted alcohol
Hydrastis	G 100, A 600, W 200	A 2, W 1
Rosæ	G 100, A 500, W 400	Diluted alcohol
Sarsaparillæ Compositum	G 100, A 500, W 400	Diluted alcohol
Taraxaci	G 100, A 500, W 400	Diluted alcohol
Uvæ Ursi	G 100, A 300, W 500	A 1, W 2

Menstruum containing glycerin and acid, 1.

Fluidextractum.	Menstruum I.	Menstruum II.
Cinchonæ	G 100, Dil. HCl 100, A 800	A 4, W 1

Menstruum containing acid, 3 plus 1 in the preceding group.

Fluidextractum.	Menstruum I.	Menstruum II.
Ergotæ	HCl 20, Dil. alc. 980	Diluted alcohol
Ipecacuanhæ	Dil. HCl 100, A 200, W 200	A 2, W 3
Lobeliæ	Acet. Acid. 50, A 500, W 450	Diluted alcohol

"**Type Process C.**—Divide 1000 gm. of the drug directed into three portions of 500 gm., 300 gm., and 200 gm., respectively. Moisten the first portion of the drug (500 gm.) with a sufficient quantity of the prescribed menstruum to render it evenly and distinctly damp and to maintain it so after macerating for six hours in a tightly covered container. Then pack it in a cylindrical percolator and add enough of the menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for forty-eight hours, and then allow the percolation to proceed slowly, gradually adding more of the menstruum. Reserve the first 200 mils of percolate and continue the process until the additional percolate measures 1500 mils, the latter being collected in successive portions of 300 mils each.

Moisten the second portion of the drug (300 gm.) with a sufficient quantity of the percolate collected in the preceding operation immediately after the reserved portion to render it evenly and distinctly damp and to maintain it so after macerating for six hours in a tightly covered container. Then pack it in a cylindrical percolator and macerate and percolate as directed for the first part of the drug, using as menstruum the several portions of percolate from the preceding operation in the order in which they have been collected, and, if this be insufficient, follow with some of the original menstruum. Reserve the first 300 mils of percolate and continue the process until the additional percolate measures 800 mils, collecting the weaker percolate in successive portions of 200 mils each.

Moisten the third portion of the powdered drug (200 gm.) with a sufficient quantity of the percolate collected in the preceding operation immediately after the reserved portion, to render it evenly and distinctly damp and to maintain it so after macerating for six hours in a tightly covered container. Then pack it in a cylindrical percolator and macerate and percolate as before, using as menstruum the several portions of percolate from the preceding operation in the order in which they have been collected, and, if this be insufficient, follow with more of the original menstruum. Collect 500 mils of percolate and mix this with the two portions previously reserved so as to make 1000 mils of finished fluidextract.

When Type Process C is directed for fluidextracts which are adjusted by assay to a definite alkaloidal standard, collect only 420 mils of percolate from the third portion of drug instead of the 500 mils directed above. Mix this percolate with the two portions previously reserved, assay a portion of the mixture and then adjust its volume, by the addition of the menstruum directed, so that each 100 mils of finished fluidextract will contain the prescribed amount of alkaloid."

FLUIDEXTRACTS PREPARED BY PROCESS C, 3

Fluidextractum.	Menstruum.
Aconiti	A 3, W 1
Aromaticum	Alcohol
Aurantii Amari	A 3, W 1

"**Type Process D.**—To 1000 gm. of the ground drug add 5000 mils of boiling water, mix thoroughly and allow it to macerate in a covered container for two hours in a warm place. Then transfer the moist drug to a tinned or enameled metallic percolator and allow the per ally adding boiling water until th he percolate on a water- d, and when cold a

FLUIDEXTRACTS PREPARED BY PROCESS D, 3

Fluidextractum.	Menstruum.
Cascaræ Sagradæ	A 250, W q. s.
Frangulæ	A 250, W q. s.
Tritici	A 200, W q. s.

FLUIDEXTRACTS PREPARED BY SPECIAL PROCESSES, 4

Fluidextractum Cascaræ Sagradæ Aromaticum.
Fluidextractum Glycyrrhizæ.
Fluidextractum Scillæ.
Fluidextractum Senegæ.

Advantage of Class.—They represent in permanent liquid form the active principles of the drug, mil for gm. The dose, which is the same as that of the drug, is relatively small and the therapeutic effect of the alcoholic solvent is reduced to the minimum.

Incompatibilities.—Aqueous liquids are incompatible with most fluidextracts, especially those containing resinous substances. Most of them are darkened or precipitated with iron preparations owing to the tannin-like bodies which they contain.

Fluidextracts of cinchona, ergot, ipecac, and lobelia are acid and hence have the incompatibilities of acids. Fluidextracts of glycyrrhiza and senega are alkaline and have the corresponding incompatibilities.

Preservation.—"Fluidextracts should be kept in tightly stoppered containers for one month, and then, if perfectly clear, they should be stored in amber-colored bottles, protected from sunlight and extremes of temperature. If sedimentation has occurred, the clear portion should be decanted, the remainder filtered, and the liquids thoroughly mixed before storing."

Administration.—They may be administered alone or in combination with other liquid remedies. They are often diluted with either elixir of glycyrrhiza or aromatic elixir.

FLUIDEXTRACTUM ACONITI—Fluidextract of Aconite—Fldext. Aconit.

Contains 0.45 to 0.55 g/m of ether-soluble alkaloids. Biological assay, M.L.D., not greater than 0.00004 mil per gramme body weight of guinea-pig.

Prepared by Process C.

Cardiac depressant. Dose, 0.03 mil.

FLUIDEXTRACTUM AROMATICUM—Aromatic Fluidextract —**Fldext. Aromat.**

Prepared by Process C. Alcoholic.

Used principally in compounding, carminative, flavoring. Dose, 1 mil.

FLUIDEXTRACTUM ASPIDOSPERMATIS (IX)—Fluidextract of Aspidosperma—**Fldext. Aspidosp.**—*Fluidextract of Quebracho*

Prepared by Process B.

Tonic, febrifuge, respiratory stimulant. Dose, 4 mils.

FLUIDEXTRACTUM AURANTII AMARI—Fluidextract of Bitter Orange Peel—**Fldext. Aurant. Amar.**

Prepared by Process C.

Flavor, stomachic. Dose, 1 mil.

FLUIDEXTRACTUM BELLADONNÆ RADICIS—Fluidextract of Belladonna Root—**Fldext. Bellad. Rad.**

Contains 0.405 to 0.495 g/m alkaloids.

Prepared by Process A.

An ingredient in belladonna liniment, 95 per cent. by volume.

Local anodyne, circulatory and respiratory stimulant, antisecretory. Dose, 0.05 mil.

FLUIDEXTRACTUM BUCHU—Fluidextract of Buchu—**Fldext. Buchu**

Prepared by Process A. Alcoholic.

Diuretic, diaphoretic, expectorant. Dose, 2 mils.

FLUIDEXTRACTUM CANNABIS—Fluidextract of Cannabis—**Fldext. Cannab.**—*Fluidextractum Cannabis Indicæ*, U. S. P. VIII

Biological assay. Not more than 0.03 mil per kilogram body weight of dog produces incoördination.

Prepared by Process A. Alcoholic.

Analgesic, narcotic. Dose, 0.1 mil.

FLUIDEXTRACTUM CASCARÆ SAGRADÆ—Fluidextract of Cascara Sagrada—**Fldext. Cascar. Sagr.**—*Fluidextractum Rhamni Purshianæ*, U. S. P. VIII

Prepared by Process D.
Tonic, laxative, stomachic. Dose, 1 mil.

FLUIDEXTRACTUM CASCARÆ SAGRADÆ AROMATICUM—Aromatic Fluidextract of Cascara Sagrada—**Fldext. Cascar. Sagr. Arom.**—*Fluidextractum Rhamni Purshianæ Aromaticum*, U. S. P. VIII

Prepared by extracting a mixture of 100 gm. of cascara sagrada in No. 40 powder and 12.5 gm. magnesium oxide with boiling water, concentrating, dissolving 4 gm. pure extract of glycyrrhiza in the warm extract, cooling, and adding 20 mils glycerin, following with a solution composed of 25 mils alcohol, 0.1 gm. benzosulphinide, 0.25 mil oil of anise, 0.02 mil oil of cassia, 0.01 mil oil of coriander, and 0.02 mil methyl salicylate, and finally enough water to make 100 mils.

The object of the magnesium oxide is to destroy the bitter taste.
Laxative, stomachic. Dose, 2 mils.

FLUIDEXTRACTUM CIMICIFUGÆ—Fluidextract of Cimicifuga—**Fldext. Cimicif.**—*Fluidextract of Black Cohosh; Fluidextract of Black Snakeroot*

Prepared by Process A. Alcoholic.
Astringent, bitter, antispasmodic. Dose, 1 mil.

FLUIDEXTRACTUM CINCHONÆ—Fluidextract of Cinchona—**Fldext. Cinchon.**—*Fluidextract of Calisaya Bark*

Contains 4 to 5 g/m of alkaloids.
Prepared by Process B.
Antiperiodic, tonic. Dose, 1 mil.

FLUIDEXTRACTUM COLCHICI SEMINIS—Fluidextract of Colchicum Seed—**Fldext. Colch. Sem.**

Contains 0.36 to 0.44 g/m colchicin.

Prepared by Process A from colchicum seed that has been freed from fatty matter by percolation with benzin.

Antirheumatic. Dose, 0.2 mil.

FLUIDEXTRACTUM DIGITALIS—Fluidextract of Digitalis—**Fldext. Digital.**

Biological assay, M.L.D., not greater than 0.0006 mil per gramme body weight of frog.

Prepared by Process A.

Heart stimulant, diuretic. Dose, 0.05 mil.

FLUIDEXTRACTUM ERGOTÆ—Fluidextract of Ergot—**Fldext. Ergot.**

Prepared by Process B.

Uterine hemostatic. Dose, 2 mils.

FLUIDEXTRACTUM ERIODICTYI—Fluidextract of Eriodictyon—**Fldext. Eriodict.**—*Fluidextract of Yerba Santa*

Prepared by Process A.

Stimulant, expectorant, vehicle for bitter drugs. Dose, 1 mil.

FLUIDEXTRACTUM EUCALYPTI—Fluidextract of Eucalyptus—**Fldext. Eucalypt.**

Prepared by Process A.

Carminative, stomachic, expectorant, diuretic. Dose, 2 mils.

FLUIDEXTRACTUM FRANGULÆ—Fluidextract of Frangula—**Fldext. Frangul.**—*Fluidextract of Buckthorn Bark*

Prepared by Process D.

Cathartic. Dose, 1 mil.

FLUIDEXTRACTUM GELSEMII—Fluidextract of Gelsemium—**Fldext. Gelsem.**

Prepared by Process A.

Dose, 0.03 mil.

FLUIDEXTRACTUM GENTIANÆ—Fluidextract of Gentian **Fldext. Gentian.**

Prepared by Process A.

Bitter stomachic. Dose, 1 mil.

FLUIDEXTRACTUM GLYCYRRHIZÆ—Fluidextract of Glycyrrhiza—**Fldext. Glycyrrh.**—*Fluidextract of Licorice*

Prepared by extracting 100 gm. of glycyrrhiza in No. 20 powder with a menstruum composed of 3 volumes ammonia-water and 27 volumes chloroform-water, concentrating the percolate to about 75 mils, adding 25 mils alcohol, and letting stand seven days; filtering and making up the volume of filtrate to 100 mils by adding a sufficient amount of a mixture of (1 to 3) alcohol and water. The chloroform-water prevents fermentation during the extraction and the ammonia-water converts the glycyrrhizic acid into a neutral salt which is more soluble and sweeter.

An ingredient in elixir of glycyrrhiza, 12.5 m/m, and in compound syrup of sarsaparilla, 1.5 m/m.

Demulcent, sweetening agent. Dose, 2 mils.

FLUIDEXTRACTUM GRANATI—Fluidextract of Pomegranate —**Fldext. Granat.**

Prepared by Process B.

Teniafuge. Dose, 2 mils.

FLUIDEXTRACTUM GRINDELIÆ—Fluidextract of Grindelia —**Fldext. Grindel.**

Prepared by Process A.

Expectorant. Dose, 2 mils.

FLUIDEXTRACTUM GUARANÆ—Fluidextract of Guarana—**Fldext. Guaran.**

Contains 3.6 to 4.4 g/m of caffeine.

Prepared by Process A.

Against headaches, astringent in diarrhea. Dose, 2 mils.

FLUIDEXTRACTUM HYDRASTIS—Fluidextract of Hydrastis —**Fldext. Hydrast.**—*Fluidextract of Golden Seal*

Contains 1.8 to 2.2 g/m ether-soluble alkaloids.

Prepared by Process B.

Bitter tonic, astringent, alterative. Dose, 2 mils.

FLUIDEXTRACTUM HYOSCYAMI—Fluidextract of Hyoscyamus—**Fldext. Hyosc.** *Fluidextract of Henbane*

Contains 0.055 to 0.075 g/m of alkaloids.
Prepared by Process A.
Hypnotic, antispasmodic. Dose, 0.2 mil.

FLUIDEXTRACTUM IPECACUANHÆ—Fluidextract of Ipecac—**Fldext. Ipecac.**

Contains 1.8 to 2.2 g/m of ether-soluble alkaloids.
Prepared by Process B.
An ingredient in syrup of ipecac, 7 m/m.
Expectorant, diaphoretic, emetic. Dose, 0.05 mil.

FLUIDEXTRACTUM LOBELIÆ—Fluidextract of Lobelia—**Fldext. Lobel.**

Prepared by Process B.
Anti-asthmatic, expectorant. Dose, 0.15 mil.

FLUIDEXTRACTUM NUCIS VOMICÆ—Fluidextract of Nux Vomica—**Fldext. Nuc. Vom.**

Contains 2.37 to 2.63 g/m alkaloids.
Prepared by Process A.
Motor excitant, circulatory and respiratory stimulant, stomachic. Dose, 0.05 mil.

FLUIDEXTRACTUM PILOCARPI—Fluidextract of Pilocarpus—**Fldext. Pilocarp.**—*Fluidextract of Jaborandi*

Contains 0.55 to 0.65 g/m alkaloids.
Prepared by Process A.
Diaphoretic. Dose, 2 mils.

FLUIDEXTRACTUM PODOPHYLLI—Fluidextract of Podophyllum—**Fldext. Podophyll.**

Prepared by Process A. Alcoholic.
Drastic cholagogue, cathartic. Dose, 0.5 mil.

FLUIDEXTRACTUM RHEI—Fluidextract of Rhubarb—**Fldext. Rhei**

Prepared by Process A.
An ingredient in syrup of rhubarb, 10 m/m.
Purgative, astringent, stomachic. Dose, 1 mil.

FLUIDEXTRACTUM ROSÆ—Fluidextract of Rose—**Fldext. Rosæ**

Prepared by Process B.
An ingredient in honey of rose, 12 m/g.
Flavoring agent, astringent. Dose, 2 mils.

FLUIDEXTRACTUM SABAL (IX)—Fluidextract of Sabal—**Fldext. Sabal**—*Fluidextract of Saw Palmetto*

Prepared by Process A.
Diuretic, expectorant, sedative. Dose, 1 mil.

FLUIDEXTRACTUM SARSAPARILLÆ—Fluidextract of Sarsaparilla—**Fldext. Sarsap.**

Prepared by Process A.
An ingredient in compound syrup of sarsaparilla, 20 m/m.
Alterative. Dose, 2 mils.

FLUIDEXTRACTUM SARSAPARILLÆ COMPOSITUM—Compound Fluidextract of Sarsaparilla—**Fldext. Sarsap. Co.**

Prepared by Process B from a mixture composed of 75 per cent. sarsaparilla, 12 per cent. glycyrrhiza, 10 per cent. sassafras, and 3 per cent. mezereum.

A permanent preparation intended to represent the medicinal virtues of compound decoction of sarsaparilla, U. S. P. VIII.

Alterative. Dose, 2 mils.

FLUIDEXTRACTUM SCILLÆ—Fluidextract of Squill—**Fldext. Scill.**

Biological assay, M.L.D., not greater than 0.0006 mil per gramme of body weight of frog.

Prepared by extracting 100 gm. of squill in No. 20 powder *by alternately* macerating and percolating it with a menstruum made of A. 2 vol. and W. 1 vol., concentrating the percolate to 80 mils, adding 200 mils alcohol; letting stand for twelve hours, decanting the supernatant liquid, and washing the syrupy residue with two portions of 30 mils each of a mixture of A. 4 vol. and W. 1 vol.; filtering; reducing by distillation to 80 mils, and adjusting the strength after assaying by adding diluted alcohol.

An ingredient in compound syrup of squill, 8 m/m.

Expectorant and diuretic. Dose, 0.1 mil.

FLUIDEXTRACTUM SENEGÆ—Fluidextract of Senega—**Fldext. Seneg.**

Prepared by percolating 100 gm. of senega in No. 30 powder with a menstruum composed of A. 2 vol. and W. 1 vol.; concentrating, adding ammonia-water to faint alkalinity, and finally menstruum enough to make 100 mils. The ammonia-water is added to prevent gelatinization.

An ingredient in syrup of senega, 20 m/m, and compound syrup of squill, 8 m/m.

Expectorant, emetic. Dose, 1 mil.

FLUIDEXTRACTUM SENNÆ—Fluidextract of Senna—**Fldext. Senn.**

Prepared by Process A.

An ingredient in compound syrup of sarsaparilla, 1.5 m/m, and in syrup of senna, 25 m/m.

Purgative. Dose, 2 mils.

FLUIDEXTRACTUM SPIGELIÆ—Fluidextract of Spigelia—**Fldext. Spigel.**—*Fluidextract of Pink Root*

Prepared by Process A.

Anthelmintic. Dose, 5 mils.

FLUIDEXTRACTUM STAPHISAGRIÆ—Fluidext [illegible] Staphisagria—**Fldext. Staphisag.**—*Fluidextract of S* [illegible]

Prepared by Process A. Alcoholic.

If oil separates, it may be removed by chilling an [illegible] the cold fluidextract through a filter mo [illegible] with alc [illegible]

Parasiticide. Not used internally.

FLUIDEXTRACTUM STILLINGIÆ—Fluidextract of Stillingia —**Fldext. Stilling.**

Prepared by Process A.
Alterative. Dose, 2 mils.

FLUIDEXTRACTUM SUMBUL—Fluidextract of Sumbul—**Fldext. Sumbul**—*Fluidextract of Musk Root*

Prepared by Process A.
Antispasmodic. Dose, 2 mils.

FLUIDEXTRACTUM TARAXACI—Fluidextract of Taraxacum —**Fldext. Tarax.**—*Fluidextract of Dandelion*

Prepared by Process B.
Mild laxative, diuretic. Dose, 10 mils.

FLUIDEXTRACTUM TRITICI—Fluidextract of Triticum—**Fldext. Tritic.**—*Fluidextract of Couch Grass*

Prepared by Process D.
Demulcent, diuretic. Dose, 10 mils.

FLUIDEXTRACTUM UVÆ URSI—Fluidextract of Uva Ursi—**Fldext. Uvæ Ursi**

Prepared by Process B.
Diuretic, urinary antiseptic, astringent. Dose, 2 mils.

FLUIDEXTRACTUM VERATRI VIRIDIS—Fluidextract of Veratrum Viride—**Fldext. Verat. Vir.**—*Fluidextract of Green Hellebore*

Prepared by Process A. Alcoholic.
Circulatory depressant. Dose, 0.1 mil.

FLUIDEXTRACTUM VIBURNI PRUNIFOLII—Fluidextract of Viburnum Prunifolium—**Fldext. Viburn. Prun.**—*Fluidextract of Black Haw*

Prepared by Process A.
Antispasmodic in uterine colic. Dose, 2 mils.

FLUIDEXTRACTUM XANTHOXYLI—Fluidextract of Xanthoxylum—**Fldext. Xanthox.**—*Fluidextract of Prickly Ash*

Prepared by Process A.
Alterative. Dose, 2 mils.

FLUIDEXTRACTUM ZINGIBERIS—Fluidextract of Ginger—**Fldext. Zingib.**

Prepared by Process A. Alcoholic.
An ingredient in syrup of ginger, 3 m/m.
Stomachic, carminative, flavoring agent. Dose, 1 mil.

FLUIDGLYCERATA, N. F.—FLUIDGLYCERATES

Origin.—Compounded from fluid + glycerate.

N. F., 5.

Definition.—A class of preparations intended to be of the same drug strength as fluidextracts, but differing in that they contain 50 per cent. by volume of glycerin and are non-alcoholic.

Methods of Preparation.—They may be prepared from any drug which does not require acid or alkaline menstruum by a general process. In certain cases a special process is directed in the N. F.

The **general process** consists in extracting 1000 gm. of the coarsely comminuted drug by percolation, conducted in the usual way, but using an initial menstruum composed of 500 mils of glycerin and 1500 mils of water, and completing the extraction with chloroform-water; 500 mils of the percolate is reserved, and the remainder, after being evaporated to 600 mils, is mixed with the reserve portion, and the mixture reduced by evaporation to 1000 mils. After a few days the clear liquid is decanted and the residue strained.

Advantage of Class.—They are sweet and non-alcoholic and mix well with water. Alcohol as a vehicle is sometimes objectionable on account of its irritating or stimulating action.

Incompatibilities.—Similar to aqueous liquids.

Preservation.—They should be kept in well-stoppered bottles.

Administration.—They are used internally either alone or in combination.

GARGARISMATA, N. F.—GARGLES

Origin.—L. Gr., *gargarisma* = gargle.

N. F., 1.

Definition.—Gargles are liquid preparations, usually either antiseptic or astringent, used to wash the mouth and throat in order to relieve inflammation. Liquids with which to gargle.

Method of Preparation.—They are usually prepared by simple solution.

GELATINA—GELATINS

Origin.—L., *gelare*, to freeze, jelly.

Pharmacopœial, 1; N. F., 1.

Definition.—Solid or semisolid substances used as emollients or as vehicles, having gelatin or mucilaginous or pectinous principles of plants as a base.

GELATINUM CHONDRI, N. F.—Chondrus Gelatin—Gelat. Chondr.—*Irish Moss Gelatin*

Prepared by scaling on glass plates, a concentrated decoction of chondrus.

Demulcent.

GELATINUM GLYCERINATUM, U. S. P.—Glycerinated Gelatine—Gelat. Glycerin.

Prepared by pouring sufficient, previously boiled and cooled, distilled water on 50 gm. gelatin to cover it and allowing it to stand one hour, then pouring off the water and allowing the gelatin to drain for a few minutes; then transferring it to a dish, adding 50 gm. glycerin, and heating it on a water-bath until the gelatin is dissolved; then straining the solution while hot, transferring to a tared dish, and continuing the heating on the water-bath until the product weighs 100 gm.

An ingredient in suppositories and glycerogelatins.

Vehicle.

GLYCERITA—GLYCERITES

Origin.—Gr. compound of *glycer* + *in*, glycerin + *ite*, derived from glycerin.

Pharmacopœial, 5; U. S. P. VIII, 6; N. F., 6.

Definition.—Glycerites are solutions or mixtures of medicinal substances in glycerin.

Methods of Preparation.—I. Simple solution: cold, glyceritum phenolis; hot, glyceritum acidi tannici, glyceritum amyli.

II. Simple solution with percolation, glyceritum hydrastis.

III. Chemical reaction and simple solution, glyceritum boroglycerini.

Advantage of Class.—They have a sweet taste and are readily miscible with aqueous liquids. They resemble aqueous liquids rather than alcoholic ones, but are more permanent than the former. The peculiar properties of glycerin as a solvent are here utilized to their best advantage.

Incompatibilities.—They are incompatible with oxidizing agents.

Preservation.—They should be kept in tightly stoppered bottles if liquid, and in jars with closely fitting covers if jelly-like, because the glycerin is hygroscopic.

Administration.—They are used both internally and externally, either alone or in combination.

GLYCERITUM ACIDI TANNICI—Glycerite of Tannic Acid—Glycer. Acid. Tann.—*Glycerite of Tannin*

A thick, syrupy, amber-colored liquid.

Prepared by heating 80 gm. glycerin in a wide-mouthed bottle on a water-bath; adding 20 gm. tannic acid in divided portions; agitating until dissolved, and finally straining the warm liquid through purified cotton.

One of the most suitable preparations of tannic acid for external use. Also used internally.

Astringent. Dose, 2 mils.

GLYCERITUM AMYLI—Glycerite of Starch—Glycer. Amyl.

A translucent jelly. Preserve in jars with closely fitting covers.

Prepared by adding 80 gm. glycerin to a smooth mixture of 10 gm. starch with 10 mils water, and heating and stirring at a temperature [illegible]

Der [illegible] a substitute for fatty pre [illegible]

GLYCERITUM BOROGLYCERINI—Glycerite of Boroglycerin —**Glycer. Boroglyc.**

A thick, viscid, sweet, colorless or slightly yellowish liquid.

Prepared by heating 46 gm. glycerin in a tared dish on a sand-bath to 150° C.; adding 31 gm. boric acid, heating and stirring until the boric acid is dissolved and the solution reduced to 50 gm.; then mixing intimately with 50 gm. glycerin.

Chemical Reaction:

$$H_3BO_3 + C_3H_5(OH)_3 = C_3H_5BO_3 + 3H_2O$$

Antiseptic. Used externally, mostly.

GLYCERITUM HYDRASTIS—Glycerite of Hydrastis—**Glycer. Hydrast.**—*Glycerite of Golden Seal*

Contains 1.12 to 1.37 g/m of ether-soluble alkaloids.

A bright yellow, thick liquid.

Prepared by percolating 100 gm. hydrastis with alcohol, distilling off most of the alcohol, pouring the concentrated residue into 45 mils of ice-cold water, and allowing to stand twenty-four hours; then filtering, assaying, and finally adding enough water to make the product, when mixed with an equal volume of glycerin, contain 1.25 g/m of alkaloids.

It is weaker than the fluidextract because some of the alkaloids are precipitated along with the resins by the ice-cold water.

Local astringent and alterative, tonic. Dose, 2 mils.

GLYCERITUM PHENOLIS—Glycerite of Phenol—**Glycer. Phenol.**—*Glycerite of Carbolic Acid*

A thick, nearly colorless liquid when recently made.

Prepared by dissolving 20 mils liquefied phenol in 80 mils glycerin.

A water-soluble preparation of phenol.

Antiseptic. Dose, 0.3 mil.

GLYCEROGELATINA, N. F.—GLYCEROGELATINS

N. F., 4.

Definition.—Glycerogelatins are soft masses for external use, melting at body temperature, composed of gelatin, glycerin, water, and medicament.

They are used extensively by dermatologists.

INFUSA—INFUSIONS

Origin.—L. *infusus*, pour in.

Pharmacopœial, 2; U. S. P. VIII, 3; N. F., 5.

Definition.—Infusions are liquid preparations made by extracting vegetable substances with hot water. (Occasionally cold water is used.)

Method of Preparation.—They are prepared by macerating the drug in hot water.

Caution.—They should not be prepared by diluting fluidextracts.

The Pharmacopœia IX directs that infusions must be freshly made from the drugs, and when the strength of infusions is not otherwise directed they are to be prepared by the following general formula:

The drug, coarsely comminuted.......	50 gm.
Water, a sufficient quantity to make..	1000 mils

Introduce the substance into a suitable vessel provided with a cover, pour upon it 1000 mils of boiling water, cover the vessel tightly, and allow it to stand for half an hour in a warm place.

Then strain with expression and pass enough water through the strainer to make the infusion measure 1000 mils. If the activity of the infusion is affected by heat, cold water should be used.

Caution.—The strength of infusions of potent or very active drugs should be specially directed by the physician.

Advantage of Class.—These preparations are non-alcoholic and afford a convenient and inexpensive way of administering, in liquid form, those drugs whose principles are soluble in water. Sugar, gum, and pectin are usually present in infusions and also starch, if prepared with hot water.

Incompatibilities.—They have all the incompatibilities of aqueous liquids and of vegetable extracts. Most of them contain tannic acid and therefore should not be combined with preparations containing salts of iron.

Preservation.—They should be freshly prepared and protected from atmospheric dust.

Administration.—They are usually administered uncombined with other preparations and in rather large doses: 30 to 120 mils.

INFUSUM DIGITALIS—Infusion of Digitalis—Inf. Digit.

The U. S. P. IX directs that it must be freshly prepared from the leaves.

Prepared by pouring 50 mils of boiling water on 1.5 gm. digitalis; macerating for one hour; straining; adding 15 mils cinnamon water, and enough water through the strainer to make 100 mils.

Diuretic. Dose, 4 mils.

INFUSUM SENNÆ COMPOSITUM—Compound Infusion of Senna—Inf. Senn. Co.

The U. S. P. IX directs that it must not be dispensed unless recently prepared.

Prepared by pouring 80 mils boiling water upon 6 gm. senna, 12 gm. manna, and 2 gm. fennel; macerating for half an hour; then straining; expressing and dissolving 12 gm. magnesium sulphate in the infusion; again straining, and finally passing enough water through the strainer to make 100 mils.

Laxative, cathartic. Dose, 120 mils.

INUNCTA, N. F.—INUNCTIONS

Origin.—L. *in* = on, *ungere* = smear.

N. F., 2.

Definition.—A semisolid preparation for external use, stimulating in character, similar to but less greasy than ointments. The basis of the N. F. ones is hydrous wool-fat.

LINIMENTA—LINIMENTS (EMBROCATIONS)

Origin.—L. *linere*, smear.

Pharmacopœial, 8; U. S. P. VIII, 8; N. F., 9.

Definition.—Liniments are alcoholic, oily, or soapy liquid preparations for external use, to be applied with friction.

Method of Preparation.—They are prepared chiefly by simple solution. Chemical reaction occurs in two of them, linimentum ammoniæ and linimentum calcis.

Advantage of Class.—Owing to their alcoholic, oily, or soapy nature they penetrate the fatty surface of the skin more readily than do aqueous liquids, and according to their character the action may be soothing, stimulating, irritating, or even vesicating.

Incompatibilities.—They are rarely prescribed in combination.

Preservation.—They should be kept in well-stoppered bottles.

Administration.—They should be plainly marked for "external use," and if "mixtures" they should be dispensed with a "shake" label.

LINIMENTUM AMMONIÆ—Ammonia Liniment—**Lin. Ammon.**—*Volatile Liniment; Hartshorn Liniment*

A milky liquid somewhat resembling an emulsion caused by the partial saponification of the oil.

Prepared by shaking together 25 mils ammonia-water and 75 mils sesame oil until a uniform mixture results.

Rubefacient, counterirritant.

LINIMENTUM BELLADONNÆ—Belladonna Liniment—**Lin. Bellad.**

Prepared by dissolving 5 gm. camphor in enough fluidextract of belladonna to make 100 mils.

Anodyne, antisecretory.

LINIMENTUM CALCIS—Lime Liniment—**Lin. Calc.**—*Carron Oil*

A milky liquid somewhat resembling an emulsion, caused by the partial saponification of the oil.

Prepared by shaking together equal parts by volume of lime-water and linseed oil.

Soothing emollient. A protective application for recent burns and scalds.

LINIMENTUM CAMPHORÆ — Camphor Liniment—**Lin. Camph.**—*Camphorated Oil*

Contains 19.5 to 20.5 per cent. of camphor.

Prepared by dissolving 20 gm. camphor in 80 gm. hot cotton seed oil by agitation in a stoppered bottle, to prevent loss of camphor by volatilization.

Anodyne.

LINIMENTUM CHLOROFORMI—Chloroform Liniment—Lin. Chlorof.

Prepared by dissolving 30 mils chloroform in enough soap liniment to make 100 mils.

Anodyne. To obtain full effect cover with a waxed paper to prevent volatilization of the chloroform.

LINIMENTUM SAPONIS—Soap Liniment—Lin. Sapon.—*Liquid Opodeldoc*

Prepared by dissolving in a bottle by agitation, 6 gm. dried granulated soap, 4.5 gm. camphor, 1 mil oil of rosemary, 70 mils alcohol, water enough to make 100 mils, and filtering after twenty-four hours.

An ingredient in liniment of chloroform, 70 m/m.

Anodyne and mild rubefacient.

LINIMENTUM SAPONIS MOLLIS—Liniment of Soft Soap—Lin. Sapon. Moll.—*Tincture of Green Soap*

Prepared by dissolving by agitation 65 gm. soft soap and 2 mils oil of lavender in 30 mils alcohol; allowing to stand twenty-four hours; filtering, and adding through the filter enough alcohol to make 100 mils.

Lubricant for rubbing sprains and bruises. Cleansing agent, particularly for the scalp.

LINIMENTUM TEREBINTHINÆ—Turpentine Liniment—Lin. Terebinth.—*Kentish's Ointment*

A very soft ointment-like preparation.

Prepared by melting on a water-bath 65 gm. rosin cerate and then dissolving it in 35 gm. oil of turpentine.

Stimulating application especially to recently burned or scalded tissue. Best applied on lint, using due care to prevent its coming in contact with the sound tissue.

LIQUORES—SOLUTIONS

Origin.—L. *liquor*, a liquid.

Pharmacopœial, 25; U. S. P. VIII, 25; N. F., 52.

Definition.—Solutions are aqueous liquid preparations in which one or more non-volatile substances, usually inorganic chemicals, are completely dissolved.

Methods of Preparation.—They are prepared in four ways:

I. By Simple Solution:
- Liquor Ferri et Ammonii Acetatis.
- Liquor Plumbi Subacetatis Dilutus.
- Liquor Potassii Hydroxidi.
- Liquor Sodii Arsenatis.
- Liquor Sodii Chloridi Physiologicus.
- Liquor Sodii Hydroxidi.

II. By Chemical Solution:
- Liquor Ammonii Acetatis.
- Liquor Arseni et Hydrargyri Iodidi (see below).
- Liquor Calcis.
- Liquor Ferri Chloridi.
- Liquor Ferri Subsulphatis.
- Liquor Ferri Tersulphatis.
- Liquor Magnesii Citratis.
- Liquor Plumbi Subacetatis.
- Liquor Potassii Arsenitis.
- Liquor Potassii Citratis.
- Liquor Sodæ Chlorinatæ.
- Liquor Zinci Chloridi.

III. By Compound Solution:
- Liquor Acidi Arsenosi.
- Liquor Arseni et Hydrargyri Iodidi.
- Liquor Cresolis Compositus.
- Liquor Iodi Compositus.

IV. By Commercial Processes:
- Liquor Formaldehydi.
- Liquor Hydrogenii Dioxidi.
- Liquor Hypophysis.
- Liquor Sodii Glyceropho

Advantage of Class.—They afford a convenient means of dispensing the chemical substances in liquid form.

Incompatibilities.—They have, in addition to the incompatibilities of aqueous liquids, the incompatibilities of their chemical constituents. Solutions containing heavy metals are incompatible with alkali hydroxides, carbonates, sulphides, and phosphates. Basic solutions and compound solution of iodine are incompatible with alkaloidal solutions. Ferric solutions are incompatible with tannin, salicylates, benzoates, and many other organic principles.

Preservation.—They are a permanent class of preparations, but should be kept in well-stoppered bottles to prevent loss of solvent by evaporation. The solutions which contain acetates, citrates, and other easily decomposable organic principles should be freshly prepared.

Administration.—They are used both externally and internally. When given internally the dose is usually diluted with 1 to 5 volumes of water.

LIQUOR ACIDI ARSENOSI—Solution of Arsenous Acid—Liq. Acid. Arsen.—*Hydrochloric Solution of Arsenic; Solution of Arsenic Chloride*

Contains arsenous acid equivalent to 0.975 to 1.025 per cent. of As_2O_3.

Solution of arsenous acid is a clear, colorless, odorless liquid, having an acidulous taste and an acid reaction.

Prepared by boiling a mixture of 1 gm. arsenic trioxide, 5 gm. diluted hydrochloric acid, and 25 gm. distilled water in a tared flask until the arsenic trioxide is dissolved; then diluting to 100 gm. and filtering. The hydrochloric acid facilitates solution, but does not form a chloride with the arsenic.

Tonic, alterative. Dose, 0.2 mil.

LIQUOR AMMONII ACETATIS—Solution of Ammonium Acetate—Liq. Ammon. Acet.—*Spirit of Mindererus*

Contains not less than 7 per cent. of $NH_4C_2H_3O_2$, with small amounts of acetic and carbonic acids, and must not be dispensed unless it has been recently prepared.

Solution of ammonium acetate is a clear, colorless liquid free from empyreumatic odor and having a mildly saline, acidulous taste, and an acid reaction.

Prepared by dissolving 5 gm. ammonium carbonate in 100 mils of diluted acetic acid.

Chemical Reaction:

$$(NH_4HCO_3,NH_4NH_2CO_2) + 3HC_2H_3O_2 = 3NH_4C_2H_3O_2 + 2CO_2 + H_2O$$

An ingredient in solution of iron and ammonium acetate, 50 m/m.

Diaphoretic. Dose, 15 mils.

LIQUOR ARSENI ET HYDRARGYRI IODIDI—Solution of Arsenous and Mercuric Iodide—**Liq. Arsen. et Hydrarg. Iod.**—*Donovan's Solution*

Contains 0.95 to 1.05 per cent. of As_2O_3 and 0.95 to 1.05 per cent. of HgI_2.

Should be preserved in well-filled, amber-colored bottles and must not be dispensed if darker than pale yellow.

Solution of arsenous and mercuric iodide is a clear, colorless, or pale yellowish liquid, without odor, and having a disagreeable, metallic taste.

Prepared by triturating together in a mortar 1 gm. arsenous iodide, 1 gm. red mercuric iodide, and 15 mils distilled water until the salts are dissolved; filtering, and passing enough distilled water through the filter to make 100 gm.

Alterative. Dose, 0.1 mil.

LIQUOR CALCIS—Solution of Calcium Hydroxide—**Liq. Calc.** —*Lime Water*

Contains 0.14 per cent. of $Ca(OH)_2$ (74.09).

Should be preserved in well-filled, tightly stoppered bottles.

Solution of lime is a clear, colorless liquid without odor, having an alkaline taste and an alkaline reaction.

Prepared by adding distilled water to a moderate excess of lime which has been freshly slaked and purified by washing with distilled water, and mixing thoroughly.

Used in making lime liniment, 50 m/m.

Antacid, tonic, astringent. Dose, 15 mils.

LIQUOR CRESOLIS COMPOSITUS—Compound Solution of Cresol—**Liq. Cresol. Co.**

Prepared by dissolving 50 gm. cresol in a hydro-alcoholic solution of linseed oil soap and adding water to make 100 gm.

The linseed oil soap is prepared by saponifying, with the aid of heat, 30 gm. linseed oil with a solution of either 8 gm. potassium hydroxide or 5.4 gm. sodium hydroxide, in 5 mils water and 3 mils alcohol.

A powerful germicide, used externally.

LIQUOR FERRI CHLORIDI—Solution of Ferric Chloride—**Liq. Ferr. Chlor.**—*Solution of Iron Perchloride*

Contains ferric chloride corresponding to 10 to 11 per cent. of Fe.

Should be preserved in glass-stoppered bottles, protected from light.

Solution of ferric chloride is a reddish-brown liquid, sp. gv. 1.29 to 1.32 per cent., having a faint odor of hydrochloric acid; an acid, strongly styptic taste, and an acid reaction.

Prepared by acting upon 12.5 gm. iron wire, at the temperature of the water-bath, with a mixture of 42 gm. hydrochloric acid and 25 mils distilled water; boiling the mixture after the action has ceased; filtering and washing the undissolved iron with a little hot distilled water. Then adding to the filtrate 22 gm. hydrochloric acid and pouring it into 6.5 gm. nitric acid, warming gently. Then boiling until free from nitrates and finally adding 4 gm. hydrochloric acid and enough distilled water to make 100 gm.

Chemical Reactions:

$$Fe + 2HCl = FeCl_2 + H_2$$
$$3FeCl_2 + HNO_3 + 3HCl = 3FeCl_3 + NO + 2H_2O$$

Used in making ferric chloride. An ingredient in tincture of ferric chloride, 35 m/m.

Styptic, tonic. Dose, 0.1 mil.

LIQUOR FERRI ET AMMONII ACETATIS—Solution of Iron and Ammonium Acetate—**Liq. Ferr. et Ammon. Acet.**—*Basham's Mixture*

Must not be dispensed unless recently prepared.

A clear reddish-brown liquid, sp. gv. about 1.039, having an aromatic odor; a sweetish saline, afterward slightly astringent taste, and an acid reaction.

Prepared by mixing together 50 mils solution of ammonium acetate, 6 mils diluted acetic acid, 4 mils tincture of ferric chloride, 12 mils aromatic elixir, 12 mils glycerin, and enough distilled water to make 100 mils.

The deepening of the color of the solution indicates that ferric acetate is produced.

Chemical Reaction:

$$FeCl_3 + 3NH_4C_2H_3O_2 = Fe(C_2H_3O_2)_3 + 3NH_4Cl$$

Chalybeate, astringent. Dose, 15 mils.

LIQUOR FERRI SUBSULPHATIS—Solution of Ferric Subsulphate—**Liq. Ferr. Subsulph.**—*Monsel's Solution; Solution of Basic Ferric Sulphate*

Contains basic ferric sulphate, corresponding to 13 to 14 per cent. of Fe.

Preserve in well-stoppered bottles in a moderately warm place (not under 22° C.), protected from light.

A dark reddish-brown liquid, sp. gv. about 1.548, miscible with water and alcohol without decomposition, odorless or nearly so, having an acid, strongly styptic taste and an acid reaction.

Prepared by adding to a mixture of 6.5 gm. sulphuric acid 50 mils distilled water and 7 gm. nitric acid, mixed well, and heated to nearly 100° C., 67.5 gm. ferrous sulphate in 4 approximately equal portions, stirring after each addition until effervescence ceases, and if necessary adding more nitr
to complete the oxidation; then boiling the sol
assumes a red color and is free from nit
adding enough distilled water to make
necessary.

Chemical Reaction (approximately):

$$12(FeSO_4 + 7H_2O) + 3H_2SO_4 + 4HNO_3 = 3Fe_4O(SO_4)_5 + 4NO + 89H_2O$$

Astringent, styptic. Dose, 0.2 mil.

LIQUOR FERRI TERSULPHATIS—Solution of Ferric Sulphate—**Liq. Ferr. Tersulph.**—*Solution of Iron Tersulphate*

Contains normal ferric sulphate ($Fe_2(SO_4)_3 = 399.89$), corresponding to 10 to 11 per cent. of Fe.

A yellowish-brown liquid, sp. gv. about 1.432, miscible with water and alcohol in all proportions, almost odorless, having an acid, strongly styptic taste, and an acid reaction.

Prepared by adding to a mixture of 9.6 gm. sulphuric acid 25 mils distilled water and 5.6 gm. nitric acid, mixed well and heated to nearly 100° C., 50 gm. ferrous sulphate in 4 approximately equal portions, stirring after each addition until effervescence ceases, and if necessary adding more nitric acid to complete the oxidation; then boiling the solution until it assumes a clear reddish-brown color and is free from nitrates, and lastly adding enough distilled water to make 100 gm., filtering if necessary.

Chemical Reaction:

$$6(FeSO_4.7H_2O) + 3H_2SO_4 + 2HNO_3 = 3Fe_2(SO_4)_3 + 2NO + 46H_2O$$

Used as a stock preparation to furnish iron for other ferruginous preparations.

Used in the preparation of ferric hydroxide with magnesium oxide, 40 mils.

Too irritant for use as an astringent.

LIQUOR FORMALDEHYDI—Solution of Formaldehyde—**Liq. Formaldehyd.**—*Formalin*

Contains 37 per cent. by weight of CH_2O (30.02), with varying amounts of methyl alcohol to prevent polymerization. Preserve in a moderately warm place, protected from light.

A clear, colorless, or nearly colorless liquid, miscible with water and alcohol, having a pungent odor and a caustic taste. Its vapor acts as an irritant upon mucous membrane.

Obtained by saturating water with formaldehyde gas. The gas is obtained usually by the incomplete oxidation of methyl alcohol, and accomplished on a commercial scale by passing the vapor of methyl alcohol over coke heated to redness in a copper tube.

Chemical Reaction:

$$CH_3OH + O = CH_2O + H_2O$$

Powerful germicide. Not used internally.

LIQUOR HYDROGENII DIOXIDI—Solution of Hydrogen Dioxide—**Liq. Hydrog. Diox.**—*Aqua Hydrogenii Dioxidi,* U. S. P. VIII; *Solution of Hydrogen Peroxide*

Contains 3 per cent. of H_2O_2 (34.02), corresponding to 10 volumes of available oxygen. Preserve in a cool place, protected from light. Upon removing the stopper from the bottle not more than a slight pressure should be observed.

A colorless liquid, odorless or having an odor suggesting ozone, having an acid taste, producing a peculiar sensation and froth in the mouth, and an acid reaction.

Obtained in large quantities commercially by decomposing barium dioxide with phosphoric and sulphuric acids.

Chemical Reaction:

$$3(BaO_2.8H_2O) + 2H_3PO_4 = 3H_2O_2 + Ba_3(PO_4)_2 + 24H_2O$$

The solution is prone to deteriorate on keeping or on protracted agitation, and rapidly decomposes upon contact with many oxidizing as well as deoxidizing substances. If the stopper of the bottle is replaced with a pledget of cotton deterioration is retarded. Many substances have been suggested as preservatives, and acetanilid has been extensively used; it, however, is not perfect, and decomposition is indicated (in old preparations) by the development of an odor resembling nitrobenzene.

Used as a deodorant, germicide, and oxidizing agent. Used both externally and internally. Dose, 4 mils.

LIQUOR HYPOPHYSIS (IX)—Solution of Hypophysis—**Liq. Hypophysis**—*Solution of Pituitary Body*

Contains the water-soluble principles from the fresh [illegible] lobe of the pituitary body of cattle. Biologic assay [illegible] of the solution diluted 20,000 times should have [illegible] activity on the isolated uterus of the virgin guinea-pig as a 1 : 20,000,000 solution of beta-iminazolyl-ethylamine hydrochloride when tested as directed by the U. S. Hygienic Laboratory.

A transparent liquid, colorless or nearly so, having a faint characteristic odor.

Obtained by extracting the finely minced material with slightly acidulated water, boiling for ten minutes, and filtering. Sterilizing the filtrate and preserving it in a sterile condition in glass containers.

Unstriped muscle stimulant. Dose, 1 mil.

LIQUOR IODI COMPOSITUS—Compound Solution of Iodine —**Liq. Iodi Co.**—*Lugol's Solution*

Contains 4.8 to 5.2 per cent. of I and 9.8 to 10.2 per cent. of KI. Preserve in glass-stoppered bottles, protected from light.

A transparent, deep brown, colored liquid, having an odor of iodine.

Prepared by dissolving 5 gm. iodine and 10 gm. potassium iodide in enough distilled water to make 100 gm.

Alterative. Dose, 0.2 mil. (Diluted with 60 mils of water or milk to avoid irritation of the stomach.)

LIQUOR MAGNESII CITRATIS—Solution of Magnesium Citrate—**Liq. Mag. Cit.**

Contains magnesium citrate corresponding to 1.5 gm. MgO (40.32) in each 100 mils. Preserve in a bottle of heavy glass (magnesium citrate bottle). Keep the bottle on its side or inverted, in a cool place, preferably in a refrigerator.

Prepared by adding a mixture of 15 gm. magnesium carbonate in 100 mils water to a solution of 33 gm. citric acid in 150 mils hot water, stirring until dissolved; then adding 60 mils syrup, heating to the boiling-point and adding immediately 0.1 mil oil of lemon previously triturated with 5 gm. purified talc, filtering while hot into a strong bottle which has been previously rinsed with boiling water; diluting to 350 mils with boiled water and stoppering the bottle with purified cotton until cold; then adding 2.5 gm. potassium bicarbonate, immediately stoppering the bottle securely and shaking it occasionally until the potassium bicarbonate dissolves.

Chemical Reactions (approximately):

$$3[(MgCO_3)_4Mg(OH)_2.5H_2O] + 10(H_3C_6H_5O_7.H_2O) = 5Mg_3(C_6H_5O_7)_2 + 12CO_2 + 43H_2O$$

$$3KHCO_3 + H_3C_6H_5O_7.H_2O = 3CO_2 + K_3C_6H_5O_7 + 4H_2O$$

Purgative. Dose, 1 bottle, 350 mils.

LIQUOR PLUMBI SUBACETATIS—Solution of Lead Subacetate—**Liq. Plumb. Subacet.**—*Goulard's Extract*

Contains lead subacetate (approximately $Pb_2O(CH_3COO)_2$ = 548.25), corresponding to 18 per cent. of Pb. Preserve in well-stoppered bottles. On exposure to air it absorbs carbon dioxide, causing a white precipitate to form.

A clear, colorless liquid, sp. gv. about 1.245, odorless, having a very sweet, astringent taste, and an alkaline reaction to litmus.

Prepared by adding slowly and in portions a solution of 18 gm. lead acetate in 70 mils of boiling distilled water to a smooth mixture of 11 gm. lead oxide in 100 mils distilled water, boiling the mixture for half an hour, occasionally stirring and adding water to maintain about the original volume; then cooling, filtering, and adding enough recently boiled and cooled distilled water to make 100 gm.

Chemical Reaction (approximately):

$$Pb(C_2H_3O_2)_2.3H_2O + PbO = Pb_2O(C_2H_3O_2)_2 + 3H_2O$$

An ingredient in the dilute solution of lead subacetate, 40 per cent.

Astringent and sedative. For local application only.

LIQUOR PLUMBI SUBACETATIS DILUTUS—Diluted Solution of Lead Subacetate—**Liq. Plumb. Subacet. Dil.**—*Lead-water*

Preserve in small, well-filled, and tightly stoppered bot

Prepared by mixing 40 gm. solution of lead subace enough recently boiled and cooled distilled water 100 gm.

Mildly astringent, sedative. For local application

LIQUOR POTASSII ARSENITIS—Solution of Potassium Arsenite—Liq. Pot. Arsen.—*Fowler's Solution*

Contains potassium arsenite, corresponding to 0.975 to 1.025 per cent. of As_2O_3 (197.92). Preserve in amber-colored bottles.

Prepared by boiling together 1 gm. arsenic trioxide, 2 gm. potassium bicarbonate, and 10 gm. distilled water until solution is effected, then adding enough distilled water to make 97 gm., followed by 3 gm. compound tincture of lavender and filtering through paper. Contains the arsenic most probably in the form of potassium metarsenite.

Chemical Reaction:

$$K_2CO_3 + As_2O_3 = 2KAsO_2 + CO_2$$

Tonic, alterative. Dose, 0.2 mil.

LIQUOR POTASSII CITRATIS—Solution of Potassium Citrate—Liq. Pot. Cit.—*Neutral Mixture*

Contains 8 per cent. of $K_3C_6H_5O_7$ (306.34), with small amounts of citric and carbonic acids. Must not be dispensed unless it has been recently prepared.

A clear, colorless liquid, odorless, having mildly saline taste and a slightly acid reaction to litmus.

Prepared by dissolving 8 gm. potassium bicarbonate and 6 gm. citric acid, each separately, in 40 mils distilled water, filtering the solutions, and washing with enough distilled water in each case to make 50 mils; then mixing the two solutions, and when effervescence has ceased, bottling and stoppering tightly.

Refrigerant, diaphoretic. Dose, 15 mils.

LIQUOR POTASSII HYDROXIDI—Solution of Potassium Hydroxide—Liq. Pot. Hydrox.—*Liquor Potassæ; Solution of Potassa*

Contains 4.5 per cent. of KOH (56.11). Preserve in bottles made of hard glass and provided with rubber stoppers or with glass stoppers coated with petrolatum. Absorbs carbon dioxide when exposed to the air.

A clear, colorless liquid, sp. gv. about 1.046, odorless, having even when dilute a very acrid and caustic taste and an alkaline reaction. (Should not be tasted unless largely diluted.)

Prepared by dissolving 6 gm. potassium hydroxide in enough distilled water to make 100 gm.

Antacid, diuretic, antilithic. Dose, 1 mil.

LIQUOR SODÆ CHLORINATÆ—Solution of Chlorinated Soda—**Liq. Sod. Chlorinat.**—*Labarraque's Solution*

Contains 2.5 per cent. of available chlorine. Preserve in well-stoppered bottles, in a cool place, protected from light.

A clear, pale greenish liquid, having a faint odor of chlorine, a disagreeable, alkaline taste, and an alkaline reaction. It bleaches vegetable colors.

Prepared by adding a solution of 7 gm. monohydrated sodium carbonate in 50 mils hot water to a smooth mixture of 10 gm. chlorinated lime in 50 mils of water, contained in a suitable container, shaking vigorously, warming the mixture if it tends to gelatinize; then transferring it to a wetted muslin strainer, returning the first portion until the liquid passes through clear, and finally adding enough water to make 100 gm.

Chemical Reaction:

$$Ca(OCl)_2.CaCl_2 + 2Na_2CO_3.H_2O = 2NaOCl + 2NaCl + 2CaCO_3 + H_2O$$

Stimulant, antiseptic, disinfectant; used almost entirely externally.

LIQUOR SODII ARSENATIS—Solution of Sodium Arsenate—**Liq. Sod. Arsen.**

Contains 0.975 to 1.025 per cent. of Na_2HAsO_4 (185.97).

Prepared by dissolving 1 gm. exsiccated sodium arsenate in enough distilled water to make 100 gm.

Tonic, alterative, hematinic. Dose, 0.2 mil.

LIQUOR SODII CHLORIDI PHYSIOLOGICUS (IX)—Physiological Solution of Sodium Chloride—**Liq. Sod. Chlor. Physio.**—*Physiological Salt Solution; Normal Salt Solution*

Should not be used after it is forty-eight hours old.

Prepared by dissolving 0.85 gm. sodium chloride in enough freshly distilled water to make 100 mils; then sterilizing the solution, preferably in an autoclave under steam pressure, at a temperature of 115° to 120° C. for fifteen minutes, or by boiling it for at least an hour, and preserving it in a sterile condition.

Normal saline solution is isotonic, since it has about the same osmotic pressure as blood-serum.

LIQUOR SODII GLYCEROPHOSPHATIS (IX)—Solution of Sodium Glycerophosphate—Liq. Sod. Glycerophos.

Contains sodium glycerophosphate, corresponding to 50 per cent. of the anhydrous salt, $Na_2C_3H_7PO_6$ (216.10).

A clear, colorless or yellowish, more or less viscid liquid, odorless, having a saline taste and an alkaline reaction to litmus.

No Pharmacopœial method given for its preparation.

Nervine, tonic, reconstructive. Dose, 0.35 mil.

LIQUOR SODII HYDROXIDI—Solution of Sodium Hydroxide—Liq. Sod. Hydrox.—*Liquor Sodæ; Solution of Soda*

Contains 4.5 per cent. of NaOH (40.01).

Preserve in bottles made of hard glass and provided with rubber stoppers or with glass stoppers coated with petrolatum. Absorbs carbon dioxide when exposed to the air.

A clear, colorless solution, sp. gv. about 1.056, odorless, having even when dilute a very acrid and caustic taste and an alkaline reaction. (Should not be tasted unless largely diluted.)

Prepared by dissolving 5.6 gm. sodium hydroxide in enough distilled water to make 100 gm.

Antacid, diuretic. Dose, 1 mil.

LIQUOR ZINCI CHLORIDI—Solution of Zinc Chloride—Liq. Zinc. Chlor.—(Equivalent to *Burnett's Disinfecting Fluid*)

Contains 48.5 to 52 per cent. $ZnCl_2$ (136.29). Preserve in tightly stoppered bottles.

A clear, colorless liquid, sp. gv. about 1.548, odorless, having a very astringent, metallic taste and an acid reaction.

Prepared by acting upon 24 gm. granulated zinc with 84 gm. hydrochloric acid, pouring off the clear liquid; adding to 1.2 gm. nitric acid and heating at a temperature not excee 115° C. until a portion, if removed and cooled, solidifies; *cooling,* dissolving in enough distilled water to make 10 adding 1.2 gm. precipitated zinc carbonate, agitating occasionally during twenty-four hours, then setting aside until it settles clear, and lastly decanting the clear liquid.

The nitric acid is used to oxidize the ferrous chloride (formed from the iron which is an impurity in the zinc) to ferric chloride so that it may be more readily precipitated by the zinc carbonate. The following are the important chemical reactions:

$$Zn + 2HCl = ZnCl_2 + H_2 \qquad Fe + 2HCl = FeCl_2 + H_2$$
$$3FeCl_2 + 3HCl + HNO_3 = 3FeCl_3 + NO + 2H_2O$$
$$2FeCl_3 + ZnCO_3[Zn(OH)_2]_2.H_2O = 2Fe(OH)_3 + 3ZnCl_2 + CO_2$$

Disinfectant, deodorant application to cancerous and other offensive ulcers. Applied largely diluted as a compress.

LOTIONES, N. F.—LOTIONS (WASHES)

Origin.—L. *lotio*, wash. N. F., 4.

Definition.—Lotions are aqueous liquid preparations (solutions or mixtures) intended for local application without friction or rubbing.

MAGMÆ (IX)—MAGMAS

Origin.—Gr. *μάγμα*, a kneaded mass.

Pharmacopœial, 2; U. S. P. VIII, none; N. F., 1.

Definition.—Magmas are aqueous liquid preparations resembling a thin paste, composed of minute particles of suspended insoluble matter. The Pharmacopœial magmas are for internal medication,

Method of Preparation.—They are prepared by chemical reaction.

Advantage of Class.—They furnish the medicinal hydroxides in a state of very fine subdivision and in a particularly active condition.

Incompatibilities.—Not usually prescribed in combination, but would have the incompatibilities of aqueous liquids and the metallic hydroxides.

Preservation.—They should be preserved in well-closed containers.

Administration.—Dispense with a "shake label" and administer with a draft of water

MAGMA BISMUTHI (IX)—Bismuth Magma—**Magma Bism.** —*Milk of Bismuth*

Contains bismuth hydroxide, $Bi(OH)_3$, and bismuth subcarbonate, approximately $Bi_2O_2CO_3$, equivalent to 5.6 to 6.2 per cent. Bi_2O_3 (464).

Preserve in tightly stoppered bottles.

Occurs as a thick, white, opaque liquid containing bismuth hydroxide and bismuth subcarbonate in suspension and having a neutral reaction.

Prepared by pouring, while constantly stirring, a bismuth nitrate solution into a solution of 1 gm. ammonium carbonate and 48 mils ammonia-water in 400 mils distilled water, adding more ammonia-water if the mixture is not alkaline, washing the magma until neutral, and afterward diluting it with distilled water to 100 mils. The bismuth nitrate solution is made by dissolving 8 gm. bismuth subnitrate in a warm solution of 6 mils nitric acid containing 6 mils distilled water, and then pouring it, stirring constantly, into 500 mils distilled water containing 6 mils nitric acid.

Protective, sedative, astringent. Dose, 4 mils.

MAGMA FERRI HYDROXIDI, N. F.—Ferric Hydroxide Magma—**Magma Ferr. Hydrox.**—*Ferri Hydroxidum,* U. S. P. VIII; *Ferric Hydroxide; Ferric Hydrate; Hydrated Oxide of Iron; Hydrous Peroxide of Iron; Ferric Oxyhydrate; Hydrated Sesquioxide of Iron*

$Fe(OH)_3$ (106.86).

Preserve in well-stoppered, wide-mouth bottles.

Brownish-red magma without odor and having a slimy, ferruginous taste.

Practically neutral to litmus. Insoluble in simple solvents.

Prepared by precipitating solution of ferric sulphate with ammonia-water and thoroughly washing the precipitate. Sufficient water is added to the drained precipitate to make it weigh 3 gm. for each mil of solution of ferric sulphate precipitated.

Chemical Reaction:

$$Fe_2(SO_4)_3 + 6NH_4OH = 2Fe(OH)_3 + 3(NH_4)_2SO_4$$

Used as an antidote in arsenical poisoning and may be administered *ad libitum.*

MAGMA MAGNESIÆ (IX)—Magnesia Magma—Magma Mag.—*Milk of Magnesia*

Contains 6.5 to 7.5 per cent. $Mg(OH)_2$ (58.34). Preserve in wide-mouthed bottles tightly stoppered with corks that have been dipped in melted paraffin.

A thick, white liquid containing magnesium hydroxide in suspension, and having an alkaline reaction.

Prepared by adding a solution of 8 gm. sodium hydroxide in 40 mils distilled water to a smooth mixture of 12.5 gm. magnesium carbonate in 50 mils distilled water, washing the resulting magma by decantation until the washings are nearly neutral to phenolphthalein; allowing the precipitate to subside until it measures 100 mils, then decanting the supernatant liquid and bottling the product. Oil of peppermint or oil of anise, in the proportion of 0.05 m/m, or other flavor may be added.

Antacid. Dose, 10 mils.

MASSÆ—MASSES

Origin.—L. *massa*, a lump, mass of dough.

Pharmacopœial, 2; U. S. P. VIII, 2; N. F., 1.

Definition.—Masses are medicated, plastic preparations intended as stock from which to prepare pills as occasion demands.

Method of Preparation.—They are prepared by incorporation.

Advantage of Class.—They enable the pharmacist to dispense freshly prepared pills quickly and conveniently. Freshly prepared pills disintegrate in the stomach much more rapidly than those which have become hardened with age and, therefore, are considered more efficacious.

Incompatibilities.—They have none, not being prescribed in combination.

Preservation.—They should be kept in well-closed containers.

Administration.—They are usually dispensed in the form of pills.

MASSA FERRI CARBONATIS—Mass of Ferrous Carbonate—**Mass. Ferr. Carb.**—*Vallet's Mass*

Contains not less than 35 per cent. $FeCO_3$ (115.84).

Preserve in well-closed containers; blackens upon exposure to the air, due to oxidation.

A soft, pilular mass, dark greenish-gray color, having a strong ferruginous taste.

Prepared by mixing freshly prepared ferrous carbonate with 38 gm. clarified honey and 25 gm. granulated sugar and reducing the mixture by evaporation on a water-bath to 100 gm. To prepare the ferrous carbonate, pour a cold solution, made by dissolving 100 gm. ferrous sulphate in 100 mils boiling distilled water, to which 20 mils syrup has been added, into a 500-mil bottle containing a cold filtered solution of 46 gm. monohydrated sodium carbonate in 100 mils distilled water and add water to fill the bottle. After the ferrous carbonate has settled, wash it by decantation with a 5 per cent. solution of syrup in distilled water until the washings no longer have a saline taste, then drain it on a strainer and express as much of the water as possible.

Chemical Reaction:

$$FeSO_4 + Na_2CO_3 = FeCO_3 + Na_2SO_4$$

Hematinic. Dose, 250 mg.

MASSA HYDRARGYRI—Mass of Mercury—**Mass. Hydrarg.**—*Blue Mass; Blue Pill*

Contains 32 to 34 per cent. of Hg.

Preserve in well-closed containers.

Prepared by triturating in a warm mortar 1 gm. oleate of mercury with 33 gm. mercury, gradually added; then introducing a small part of the 32 gm. honey of rose, and continuing the triturating until the globules of mercury are no longer visible under a lens magnifying 10 diameters; then incorporating the remainder of the honey of rose and 9 gm. glycerin, and fi
10 gm. glycyrrhiza and 15 gm. althæa, both in No. 60 po
continuing the trituration until the mass becomes homoge

Sialagogue, mercurial alterative. Dose, 250 mg.

MELLITA—HONEYS

Origin.—L. *mel*, honey.

Pharmacopœial, 3; U. S. P. VIII, 3 (two simple and one medicated); N. F., 2.

Definition.—Medicated honeys are dense saccharine, liquid preparations consisting of medicinal substances dissolved in honey.

Methods of Preparation.—Expression, clarification, and simple solution.

Advantage of Class.—Honey, as a vehicle, is generally considered as being more palatable than preparations of sugar; and also more stimulating to the buccal membranes.

Incompatibilities.—Simple honeys have the incompatibilities of aqueous and saccharine liquids; the medicated ones have, in addition, those of the medicaments which they contain.

Preservation.—They should be kept in a cool dry place in closely covered containers.

Administration.—They are usually very palatable, and ordinarily administered without diluting.

MEL—Honey—**Mel**—*Extracted Honey*

A saccharine secretion deposited in the honey-comb by the honey bee.

A thick, syrupy liquid, sp. gv. about 1.370, light yellow to yellowish-brown in color and having a characteristic odor, a sweet, faintly acrid taste, and a slightly acid reaction. It is lævorotatory.

Obtained by removing the "caps" from the ripened honeycomb with a warmed knife, placing the decapped combs in a revolving cage, and extracting the honey by centrifugal force.

An ingredient in clarified honey, about 95 per cent., in mass of ferrous carbonate, 38 per cent., and in mercury with chalk, 10 per cent.

Sweetening agent.

MEL DEPURATUM—Clarified Honey—**Mel Depurat.**—*Mel Despumatum*, U. S. P. VIII

A thick, syrupy liquid, sp. gv., when diluted with twice its weight of water, about 1.095, and corresponding in other respects to honey.

Prepared by heating the honey with 2 per cent. of specially prepared paper pulp upon a water-bath at a temperature not exceeding 70° C., carefully removing the scum from the surface, adding distilled water to make up the loss incurred by evaporation, straining, and mixing the strained liquid with 5 per cent. of its weight of glycerin.

An ingredient in honey of rose, about 88 per cent.; mass of ferrous carbonate, 38 per cent.; and mercury with chalk, 10 per cent.

Vehicle.

MEL ROSÆ—Honey of Rose—**Mel Ros.**

Prepared by mixing 12 mils fluidextract of rose with enough clarified honey to make 100 gm.

An ingredient in mass of mercury, 32 per cent.

Vehicle, especially in gargles. Dose, 4 mils.

MISTURÆ—MIXTURES

Origin.—L. *miscere*, mix.

Pharmacopœial, 2; U. S. P. VIII, 4; N. F., 20.

Definition.—Pharmaceutically, mixtures are liquid preparations for internal use in which partially suspended insoluble matter is intentionally present. In general, a combination of different ingredients.

Method of Preparation.—Simple admixture.

Advantage of Class.—They afford a means of dispensing solid and liquid medicaments in the same preparation.

Incompatibilities.—They may have chemical and therapeutic incompatibilities, but cannot be said to have pharmaceutic incompatibilities, since by their very nature they are licensed to this kind of incompatibility.

Preservation.—They do not keep well, hence they should be freshly prepared.

Administration.—They should be dispensed with a "shake label." In order that the insoluble matter may remain in suspension long enough to insure a uniform quantity in each dose it is customary to add some substance, such as gum, mucil syrup or glycerin, to increase the viscosity of the liquid. quantity to be added will depend somewhat upon the qua of insoluble matter to be suspended. For general purposes it may be stated that mucilage of acacia, which is very popular for this purpose, should constitute from one-fourth to one-half the total bulk of the liquid.

Caution: Mixtures containing poisonous substances in solid form should not be dispensed.

MISTURA CRETÆ—Chalk Mixture—Mist. Cret.

Must not be dispensed unless it has been recently prepared.

Prepared by gradually adding 40 mils cinnamon-water and about 20 mils water to 20 gm. compound chalk powder in a mortar and triturating until a uniform mixture results, then diluting with enough water to make 100 mils.

Antacid, mild astringent. Dose, 15 mils.

MISTURA GLYCYRRHIZÆ COMPOSITA—Compound Mixture of Glycyrrhiza—Mist. Glycyrrh. Co.—*Brown Mixture*

Prepared by rubbing 3 gm. pure extract of glycyrrhiza and 3 gm. granular acacia in a mortar with 50 mils warm water until dissolved. Allowing the solution to cool, transferring it to a graduated vessel, adding 0.024 gm. antimony and potassium tartrate dissolved in 12 mils hot water, then 12 mils camphorated tincture of opium, 3 mils spirit of nitrous ether, and enough water to make 100 mils.

Expectorant. A popular cough remedy. Dose, 10 mils.

MUCILAGINES—MUCILAGES

Origin.—L. *mucere*, a slimy mass.

Pharmacopœial, 2; U. S. P. VIII, 4; N. F., 2.

Definition.—Mucilages are thick, adhesive aqueous preparations containing viscid substances in solution or suspension.

Methods of Preparation.—They are prepared by simple solution (Mucilago Acaciæ) and by maceration, with or without heat (Mucilago Tragacanthæ).

Advantage of Class.—They supply these adhesive or viscid substances in convenient form for use.

Incompatibilities.—They are incompatible with acids, alkalies, strong salt solutions, and some of them with alcoholic liquids.

Preservation.—They should be kept in small, well-filled, and tightly closed containers in a cool place.

Administration.—They are bland preparations and are administered as demulcents or in combination with other remedies.

MUCILAGO ACACIÆ—Mucilage of Acacia—Mucil. Acac.

Should be freshly made and not dispensed if sour or moldy.

Preserve in small, well-filled bottles, in a cool place, preferably in a refrigerator.

A thick, viscid liquid, colorless or slightly yellowish, odorless, having an insipid, mucilaginous taste.

Prepared by dissolving 35 gm. of acacia previously washed in cold water and drained in enough warm distilled water to make 100 gm.

Demulcent, adhesive. Dose, 15 mils.

MUCILAGO TRAGACANTHÆ—Mucilage of Tragacanth—Mucil. Trag.

Should be freshly prepared, but may be kept for some time by adding a few drops of chloroform to it.

Preserve in a wide-mouth bottle.

A nearly colorless, jelly-like preparation, odorless, and having a sweet, mucilaginous taste.

Prepared by adding 6 gm. tragacanth to a boiling hot solution of 18 gm. glycerin in 75 mils water, macerating twenty-four hours, stirring occasionally, then adding enough water to make 100 gm., beating the mixture to a uniform consistency, and straining forcibly through muslin.

An ingredient in troches of sodium bicarbonate.

Demulcent, suspending agent, adhesive. Dose, about 16 mils.

MULLÆ, N. F.—MULLS (SALVE MULLS, STEATINS)

Origin.—Mull—abbreviation of mulmul—a thin soft kind of muslin.

N. F., 4.

Definition.—Mulls are ointments of high fusing points, wh are intended to be spread on muslin before being applie the body.

NEBULÆ, N. F.—SPRAYS

Origin.—L. *nebula*, a cloud, a mist, vapor.

N. F., 5.

Definition.—Aromatic, antiseptic liquids, having liquid petrolatum as a "basis," intended to be sprayed with an atomizer into the nose or throat.

OLEA—OILS

OLEA FIXA—FIXED OILS; OLEA PINGUIA—FATTY OILS

Origin.—L. *oleum*, oil, L. *fixus*, fixed (not volatile); L. *pinguis*, fat.

Pharmacopœial, including petrolatum liquidum, 10; U. S. P. VIII, 9; N. F., none.

Definition.—A class of liquid substances unctuous to the touch, which produce on paper a greasy stain which will not disappear on warming nor wash out with water. Substances having similar properties, but which are solid at the ordinary temperatures are known collectively as fats. See page 376.

Composition.—They are not chemicals, but mixtures, and their composition varies greatly. The important groups of chemical constituents are: Alcohols, hydrocarbons, cholesterol and esters of the triatomic alcohol glycerin, with unsaturated fatty acids, chiefly oleic acid. These esters are known as glycerides and they represent the chief constituents of the greater number of fixed oils.

Method of Preparation.—They are chiefly of vegetable and of animal origin and are separated from the tissues by expression. Cold expression produces a high-grade oil for medicinal purposes. Hot expression produces a larger yield, chiefly for technical purposes.

Advantage of Class.—They represent in pure and concentrated form the bland and emollient principles of the crude substances from which they are obtained.

Incompatibilities.—They are incompatible with aqueous preparations (unless emulsified) and caution should be exercised in combining them with oxidizing agents. The esters are saponified with caustic alkalies.

SYNOPSIS OF FIXED OILS

Latin title. Abbreviation. English name. Synonyms.	Source. Average yield.	Specific gravity. Chief constituents.	Therapeutic properties. Dose.
OLEUM AMYGDALÆ EXPRESSUM—**Ol. Amygd. Exp.**—Expressed Oil of Almond—*Oil of Sweet Almond.*	Kernels of the sweet almond (40 to 54 per cent.) and the bitter almond (35 to 38 per cent.).	0.910 to 0.915. Olein, 75 to 85 per.cent.	Emollient. 4 to 30 mils.
OLEUM GOSSYPII SEMINIS—**Ol. Gossyp. Sem.**—Cottonseed Oil—*Cotton Seed Oil.*	Kernels of the cotton seed, 25 to 30 per cent.	0.915 to 0.921. Olein. Palmitin. Linolein.	Emollient. Nutrient (salad oil); crude oil used in soap making.
OLEUM LINI—**Ol. Lini**—Linseed Oil—*Oil of Flaxseed; Raw Linseed Oil.*	Flaxseed, 16 to 28 per cent.	0.925 to 0.935. Glycerides of oleic, linoleic, and linolenic acids, 85 to 90 per cent.	Protective emollient. Laxative. 30 mils. (used in painting).
OLEUM MORRHUÆ—**Ol. Morrh.**—Cod Liver Oil—*Oleum Jecoris Aselli.*	Fresh livers of the codfish.	0.918 to 0.922. Glycerides of stearic, palmitic, jecoleic, and therapic acids Cholesterol, 0.5 to 1.5 per cent., trace of iodides, phosphorus, and mineral salts.	Nutrient. Stimulant. 10 mils.

OLEUM OLIVÆ—Ol. Oliv.—Olive Oil.	Sarcocarp of ripe olives (not from the seed kernel), 13 to 88 per cent.	0.910 to 0.915. Olein, 65 per cent. Linolein, 5 per cent.	Nutrient, laxative (salad oil); crude oil used in soap making. 30 mils.
OLEUM RICINI—Ol. Ricin.—Castor Oil.	Castor beans, 25 to 45 per cent.	0.945 to 0.965. Ricinolein.	Laxative (lubricant). 15 mils.
OLEUM SESAMI (IX)—Ol. Sesam.—Sesame Oil—*Teel Oil; Benne Oil.*	Seed of sesamum or benne plant, 50 to 60 per cent.	0.916 to 0.921. Olein and linoleum, about 75 per cent., with myristin, palmitin, and stearin, about 25 per cent.	Emollient. (salad oil).
OLEUM THEOBROMATIS — Ol. Theobrom.—Oil of Theobroma—*Butter of Cacao; Cacao Butter; Coca Butter.*	Roasted seeds of cacao (chocolate nuts or beans), 35 to 45 per cent.	Yellowish-white solid, 0.973; m. p. 30° to 35° C. Glyceride of stearic acid, 35 to 40 per cent.	Emollient. Nutritive. Vehicle.
OLEUM TIGLII—Ol. Tiglii—Croton Oil.	Croton seeds (beans), 30 to 40 per cent.	0.935 to 0.950. Glycerides of oleic, stearic, etc., acids. Vesicant principle (croton-resin).	Drastic purgative. Pustulant. Counterirritant (poisonous). 0.05 mil.
PETROLATUM LIQUIDUM—Petrolat. Liq.—Liquid Petrolatum—*Liquid Paraffin; Mineral Oil.*	Crude petrolatum. See page 255.	0.828 to 0.905. Liquid hydrocarbons of the marsh-gas series.	Emollient. Laxative. 15 mils.

Preservation.—Those that contain esters are prone to a decomposition, known as hydrolysis, becoming acid (rancid). They should be kept in well-filled containers in a cool dark place.

Administration.—They are administered internally in the form of emulsion or in soft capsules, or, if used externally, in the form of liniments.

DRYING OILS.—Those like linseed oil, which on exposure to air absorb oxygen and slowly harden (dry). The film of hardened oil acts as a protective and is very resistant to the solvent action of simple solvents.

OFFICIAL PREPARATIONS CONTAINING OFFICIAL FIXED OILS

Oleum Amygdalæ Expressum: Ointment of Rose Water, 56 per cent.; Emulsion of Oil of Turpentine, 5 m/m.

Oleum Gossypii Seminis: Camphor Liniment, 80 per cent. Used in preparing soft soap, 43 per cent.

Oleum Lini: Lime Liniment, 50 m/m. Used in preparing Compound Solution of Cresol, 30 per cent.

Oleum Morrhuæ: Emulsion of Cod Liver Oil, 50 m/m.

Oleum Olivæ: Used in preparing Lead Plaster.

Oleum Ricini: Flexible Collodion, 3 per cent.

Oleum Sesami: Ammonia Liniment, 75 m/m.

Oleum Theobromatis: Suppository base.

Petrolatum Liquidum: See page 255.

OLEA INFUSA, N. F.—INFUSED OILS

Origin.—L. *oleum*, oil + L., *infusus*, pour in.

Pharmacopœial, none; N. F., General Formula.

Definition.—Infused oils are liquid preparations obtained by extracting the active principles of plants (usually narcotic) by digestion with fixed oil, usually sesame oil.

Method of Preparation.—Digestion, General Formula, N. F. IV, page 151. Strength, 10 per cent. of air-dry drug.

Preservation.—Keep in a cool place in small, amber-colored bottles.

OLEA VOLATILIA—Volatile Oils; **OLEA ÆTHEREA**—Ethereal Oils; **OLEA AROMATICA**—Aromatic Oils; **OLEA DESTILLATA**—Distilled Oils; **OLEA ESSENTIALIA**—Essential Oils.

Origin.—L. *oleum*, oil + L. *ætherius*, upper air, vapor; L. *aromaticus*, spice; L. *destillatus*, drop down, distil; L. *essentialis*, essence, the most important part or characteristic; L. *volatilis*, flying or winged.

Pharmacopœial, 30, including methyl salicylate; U. S. P. VIII, 36; N. F., 6.

Definition.—In general, a volatile oil may be considered as any liquid which produces on paper a greasy stain which will disappear on warming, but will not wash out with water. For the most part they are vegetable in origin and represent the odorous, essential, and characteristic properties of the drugs from which they are obtained.

Composition.—Since their classification is based on physical characteristics, it is to be expected that their composition will vary greatly. In general, they consist of mixtures in varying proportions of hydrocarbons and oxygenated constituents.

The important hydrocarbon constituents variously represented belong chiefly to the terpines. They are:

Cymene, $C_{10}H_{14}$, Oil of thyme.
Heptane, C_7H_{16}, Oil of digger's pine.
Styrene, $C_6H_5CH:CH_2$, Storax oil.
Terpenes, $C_{10}H_{16}$:
Cadinene—Oil of cade.
Camphene—Oil of spike.
Caryophyllene—Oil of cloves.
Dipentene—Oil of pine needles.
Fenchene—Oil of eucalyptus.
Limonine—Oil of lemon, etc.
Phellandrene—Oil of pine needles.
Pinine—Oil of turpentine.
Sylvestrene—Oil of pine needles.
Terpinene—Oil of cardamom.

The oxygenated constituents are:

- Alcohols:
  - Borneol, $C_{10}H_{18}O$, Oil of rosemary.
  - Citronellol, $C_{10}H_{20}O$, Oil of geranium.
  - Geraniol, $C_{10}H_{18}O$, Oil of palmarosa.
  - Linalool, $C_{10}H_{18}O$, Oil of lignaloe.
  - Menthol, $C_{10}H_{20}O$, Oil of peppermint.
  - Terpineol, $C_{10}H_{18}O$, Oil of cardamom.
- Aldehydes:
  - Anisic aldehyde, $C_6H_4OCH_3CHO$, Old oil of fennel.
  - Benzaldehyde, C_6H_5CHO, Oil of bitter almonds.
  - Cinnamic aldehyde, $C_6H_5CH:CHCHO$, Oil of cassia.
  - Citral, $C_{10}H_{16}O$, Oil of lemon.
  - Citronellal, $C_{10}H_{18}O$, Oil of citronella.
  - Cuminic aldehyde, $C_6H_4C_3H_7CHO$, Oil of cumin.
  - Heliotropin, $C_6H_3OOCH_2CHO$, Oil of spirea.
  - Furfurol, C_4H_4O, Oil of clove.
  - Salicylic aldehyde, C_6H_4OHCHO, Oil of spirea.
- Ketones:
  - Carvone, $C_{10}H_{14}O$, Oil of caraway.
  - Fenchone, $C_{10}H_{16}O$, Oil of fennel.
  - Menthone, $C_{10}H_{18}O$, Oil of peppermint.
  - Pulegone, $C_{10}H_{16}O$, Oil of pennyroyal.
  - Thujone, $C_{10}H_{16}O$, Oil of thuja.
- Esters:
  - Bornyl acetate, $CH_3COOC_{10}H_{17}$, Oil of rosemary.
  - Linalyl acetate, $CH_3COOC_{10}H_{17}$, Oil of bergamot.
  - Methyl salicylate, $C_6H_4OHCOOCH_3$, Oil of birch, etc.
- Oxides, Lactones:
  - Cineol (eucalyptol), $C_{10}H_{18}O$, Oil of eucalyptus.
- Phenols and phenol ethers:
  - Anethol, $C_6H_4C_3H_5OCH_3$ 1.4, Oil of anise.
  - Carvacrol, $C_6H_3CH_3OHC_3H_7$ 1.2.4, Oil of origanum.
  - Eugenol, $C_6H_3C_3H_5OCH_3OH$. 1.3.4, Oil of cloves.
  - Safrol, $C_6H_3C_3H_5OOCH_2$ 1.3.4, Oil of sassafras.
  - Thymol, $C_6H_3CH_3OHC_3H_7$ 1.3.4, Oil of thyme.

The nitrogenous and sulphurous constituents are r sented by

- Allyl isosulphocyanide, C_3H_5SCN, Oil of mustard.

Terpeneless Oil.—One from which the great bulk of the various terpenes has been removed. This separation may be accomplished by fractional distillation or by washing the oil with 70 per cent. alcohol, the terpenes being less soluble than the other constituents in this strength of alcohol.

Methods of Preparation.—They are prepared by various methods, no one method being applicable in all cases:

I. Dry Distillation, page 56.

II. Destructive Distillation, page 56.

III. Wet Distillation, page 56.

IV. Steam Distillation, which is similar to wet distillation, and differs from it only in that the steam is generated in another chamber and conducted into the chamber containing the drug. It is more economical and obviates the danger of burning the drug by the direct heat of the flame.

V. Cohobation, page 46.

VI. Enfleurage, page 59.

VII. Percolation with very volatile solvents, such as methyl chloride (restricted to the perfume industry).

VIII. Expression. Applicable to extracting the oil from the rinds of fruits, such as the orange, lemon, bergamot, etc. The oil cells are ruptured by suitable instruments and the exuding oil absorbed by pressing sponges against it. The sponges are subsequently expressed and the oil collected in suitable containers.

Advantage of Class.—They represent the medicinal virtues of the drug from which they are obtained, in convenient and concentrated form.

Incompatibilities.—They are soluble in alcohol, but only very sparingly soluble in water, hence concentrated alcoholic solutions of volatile oils will be precipitated if compounded with aqueous liquids.

Preservation.—They are more or less unstable when subjected to heat and light. Many of them undergo oxidation, with the consequent development of resinous products, and usually darken in color. They should be kept in small, well-filled. amber-colored bottles, in a moderately cool place.

[illegible] usually administered in the form [illegible] ccharates, or by adding 1 or

SYNOPSIS OF OFFICIAL VOLATILE OILS

Latin title. Abbreviation. English name. Synonyms.	Source. Process. Average yield.	Specific gravity. Chief constituents. Percentage yield from oil.	Therapeutic properties. Dose.
METHYLIS SALICYLAS—Methyl. Salicyl.—Methyl Salicylate. See page 249.	Synthetic. Sweet birch bark. Maceration and distillation. Wintergreen herb distillation, ½ to 1 per cent.	1.172 to 1.182. Methyl salicylate, 98 per cent.	Antirheumatic. 0.75 mil.
OLEUM AMYGDALÆ AMARÆ—Ol. Amygd. Amar.—Oil of Bitter Almond—*Bitter Almond Oil.*	Bitter almonds. Maceration and distillation. Nearly 1 per cent.	1.038 to 1.060. Benzaldehyde, 85 per cent. Hydrocyanic acid, 2 to 4 per cent.	Analgesic. Flavoring agent. 0.03 mil.
OLEUM ANISI—Ol. Anisi—Oil of Anise—*Oil of Star Anise; Anise Oil.*	Ripe fruit of anise or of star anise. Distillation, about 3 per cent.	0.978 to 0.988. Anethol.	Carminative. Flavoring agent. 0.2 mil.
OLEUM AURANTII—Ol. Aurant.—Oil of Orange—*Orange Oil; Oil of Sweet Orange,* U. S. P. VIII.	Fresh peel of sweet orange. Expression.	0.842 to 0.846. Limonine.	Flavoring agent. 0.2 mil.
OLEUM CADINUM—Ol. Cadin.—Oil of Cade—*Oil of Juniper Tar; Cade*	Wood of juniper shrub. Dry distillation.	0.980 to 1.055. Terpenes (cadinene), phenols.	Local stimulant. Antiseptic. Expectorant.

OLEUM CAJUPUTI—Ol. Cajup.—Oil of Cajuput—*Oil of Cajeput; Cajuput Oil.*	Fresh leaves and twigs of cajuput. Distillation.	0.912 to 0.925. Cineol. Terpineol.	Parasiticide. Irritant. Carminative. Local anesthetic. 0.5 mil.
OLEUM CARI—Ol. Cari—Oil of Caraway—*Caraway Oil.*	Fruit of caraway. Distillation, 5 to 7 per cent.	0.900 to 0.910. Carvone, 50 m/m.	Carminative. Stomachic. Flavoring agent. 0.2 mil.
OLEUM CARYOPHYLLI—Ol. Caryoph.—Oil of Clove—*Oil of Cloves; Clove Oil.*	Flower buds (cloves). Distillation, 16 to 20 per cent.	1.038 to 1.060. Eugenol, 82 m/m.	Antiseptic. Local anesthetic. Stomachic. Carminative. 0.2 mil.
EUM CASSIÆ—Ol. Cass.—Oil of Cinnamon—*Cassia Oil; Oleum Cinnamomi*, U. S. P. VIII.	Young twigs of cassia, cinnamon. Distillation, about 1 per cent. in the bark.	1.045 to 1.063. Cinnamic aldehyde, 80 m/m.	Flavoring agent. Stomachic. Carminative. 0.2 mil.
OLEUM CHENOPODII—Ol. Chenopod.—Oil of Chenopodium—*Oil of American Wormseed.*	Herb of chenopodium. Distillation, about 0.3 per cent.	0.955 to 0.980. Terpenes. Ascaridole.	Anthelminitic (removes round worm). 0.2 mil.
OLEUM CORIANDRI—Ol. Coriand.—Oil of Coriander—*Coriander Oil.*	Ripe fruit of coriander. Distillation, about 0.5 per cent.	0.863 to 0.875. Linalool. (Coriandrol).	Flavoring agent. Carminative. 0.2 mil.
OLEUM CUBEBÆ—Ol. Cubeb.—Oil of Cubeb—*Cubeb Oil.*	Unripe fruit (cubebs). Distillation, 5 to 15 per cent.	0.905 to 0.925. Terpenes.	Diuretic. Expectorant. Blennorrhetic. 0.5 mil.
OLEUM EUCALYPTI—Ol. Eucalypt. Oil of Eucalyptus—*Eucalyptus Oil.*	Fresh leaves of eucalyptus. Distillation, about 6 per cent.	0.905 to 0.925. Eucalyptol, 70 m/m.	Antiseptic. Carminative. Expectorant. Diuretic. 0.5 mil.

Latin title. Abbreviation. English name. Synonyms.	Source. Process. Average yield.	Specific gravity. Chief constituents. Percentage yield from oil.	Therapeutic properties. Dose.
OLEUM FŒNICULI—Ol. Fœnic.—Oil of Fennel—*Fennel Oil.*	Ripe fruit (fennel). Distillation, 2 to 5 per cent.	0.953 to 0.973. Anethol.	Stomachic. Carminative. Emmenagogue. 0.2 mil.
OLEUM JUNIPERI—Ol. Junip.—Oil of Juniper—*Juniper Oil; Oil of Juniper Berries.*	Ripe fruit (juniper berries). Distillation, 0.5 to 2.5 per cent.	0.854 to 0.879. Terpenes (Pinene and Cadinene).	Diuretic. 0.2 mil.
OLEUM LAVANDULÆ—Ol. Lavand.—Oil of Lavender—*Oleum Lavandulæ Florum,* U. S. P. VIII.	Fresh flowering tops of lavender. About 0.5 to 1.5 per cent.	0.875 to 0.888. Linalyl Acetate. Linalool.	Flavoring agent. 0.2 mil.
OLEUM LIMONIS—Ol. Limon.—Oil of Lemon—*Lemon Oil.*	Fresh peel of ripe lemons. Expression.	0.851 to 0.855. Aldehydes, (Citral), 4 per cent. Limonene.	Flavoring agent. Stomachic. 0.2 mil.
OLEUM MENTHÆ PIPERITÆ—Ol. Menth. Pip.—Oil of Peppermint—*Peppermint Oil.*	Flowering plant of peppermint. Distillation and steam rectification, about 1 per cent.	0.896 to 0.908. Menthol, 50 per cent.	Stomachic. Carminative. Flavoring agent. 0.2 mil.
OLEUM MENTHÆ VIRIDIS—Ol. Menth. Vir.—Oil of Spearmint—*Spearmint Oil.*	Flowering plant of spearmint. Distillation, about 0.3 to 0.5 per cent.	0.917 to 0.934. Carvone, 43 m/m.	Stomachic. Carminative. Flavoring agent. 0.2 mil.

OLEUM MYRISTICÆ—Ol. Myrist.—Oil of Myristica—*Myristica Oil; Oil of Nutmeg.*	Kernel of the ripe seed (nutmeg). Distillation, 8 to 15 per cent.	0.859 to 0.924. Pinene. Dipentine. Alcohols.	Carminative. Flavoring agent. 0.2 mil.
OLEUM PICIS LIQUIDÆ RECTIFICATUM—Ol. Pic. Liq. Rect.—Rectified Oil of Tar—*Oleum Picis Liquidæ,* U. S. P. VIII; *Rectified Tar Oil.*	From wood tar. Distillation and rectification.	0.960 to 0.990. Phenols. Hydrocarbons. Empyreumatic products.	Antiseptic. Expectorant. 0.2 mil.
OLEUM PIMENTÆ—Ol. Piment.—Oil of Pimenta—*Pimento Oil; Oil of Allspice.*	Fruit (allspice). Distillation, 2 to 4 per cent.	1.018 to 1.048. Eugenol, 65 m/m.	Antiseptic. Carminative. 0.2 mil.
OLEUM PINI PUMILIONIS (IX)—Ol. Pin. Pumil.—Oil of Dwarf Pine Needles—*Dwarf Pine Oil.*	Fresh leaves of the dwarf pine. Distillation.	0.853 to 0.869. Terpenes and Esters (bornyl acetate).	Antiseptic by inhalation (vapor).
OLEUM ROSMARINI—Ol. Rosmar.—Oil of Rosemary—*Rosemary Oil.*	Fresh flowering tops of rosemary. Distillation, 1.5 to 2 per cent.	0.894 to 0.912. Bornyl acetate, 2.5 per cent. Borneol, 10 per cent.	Flavoring, especially for local preparations. 0.2 mil.
OLEUM SANTALI—Ol. Santal.—Oil of Santal—*Santalwood Oil; Oil of Sandalwood.*	Wood of East Indian white sandalwood. Distillation, 3 to 5 per cent.	0.965 to 0.980. Alcohols, (Santalol), 90 per cent.	Diuretic. Blennorrhetic. Expectorant. 0.5 mil.
OLEUM SASSAFRAS—Ol. Sassaf.—Oil of Sassafras—*Sassafras Oil.*	Root of sassafras. Distillation, 6 to 9 per cent. in the bark of the root.	1.065 to 1.077. Safrol.	Flavoring agent. 0.2 mil.

Latin title. Abbreviation. English name. Synonyms.	Source. Process. Average yield.	Specific gravity. Chief constituents. Percentage yield from oil.	Therapeutic properties. Dose.
OLEUM SINAPIS VOLATILE—Ol. Sinap. Vol.—Volatile Oil of Mustard—*Mustard Oil.* Label must indicate its source.	Synthetic. Seeds of black mustard. Maceration and distillation, about ½ per cent.	1.013 to 1.020. Allyl-iso-thio-cyanate. 92 per cent.	Rubefacient. 0.008 mil.
OLEUM TEREBINTHINÆ—Ol. Tereb.—Oil of Turpentine—*Turpentine Oil; "Spirits of Turpentine."*	Oleoresin. (terebinthina). Distillation with water, 12 to 16 per cent.	0.860 to 0.870. Pinene.	Not used internally. Rubefacient.
OLEUM TEREBINTHINÆ RECTIFICATUM—Ol. Tereb. Rect.—Rectified Oil of Turpentine—*Rectified Turpentine Oil.*	Oil of turpentine and solution of sodium hydroxide, equal volumes. Recover ¾ of the oil by distillation. Separate the oil from the water; completely dry it by shaking with anhydrous calcium chloride and filter.	0.856 to 0.865. Pinene.	Carminative. 0.3 mil.
OLEUM THYMI—Ol. Thymi—Oil of Thyme—*Thyme Oil.*	Flowering plant (thyme). Distillation, about 2.5 per cent.	0.894 to 0.930. Phenols, (Thymol), 20 m/m.	Diuretic. Expectorant. 0.2 mil.

OFFICIAL PREPARATIONS CONTAINING OFFICIAL VOLATILE OILS

Methylis Salicylas, see page 249.

Oleum Amygdalæ Amaræ: Bitter Almond Water, 0.1 m/m; Spirit of Bitter Almond, 1 m/m.

Oleum Anisi: Anise Water, 0.2 m/m; Spirit of Anise, 10 m/m; Camphorated Tincture of Opium, 0.4 m/m, *q. v.*; Compound Spirit of Orange, 0.5 m/m, *q. v.*; Compound Syrup of Sarsaparilla, 0.02 m/m; Aromatic Fluidextract of Cascara Sagrada, 0.25 m/m.

Oleum Aurantii: Compound Spirit of Orange, 20 m/m, *q. v.*

Oleum Cari: Compound Spirit of Juniper, 0.05 m/m.

Oleum Cassiæ: Cinnamon Water, 0.2 m/m, *q. v.*; Spirit of Cinnamon, 10 m/m; Aromatic Sulphuric Acid, 0.1 m/m; Aromatic Fluidextract of Cascara Sagrada, 0.02 m/m.

Oleum Coriandri: Aromatic Fluidextract of Cascara Sagrada, 0.01 m/m; Compound Spirit of Orange, 2 m/m, *q. v.*; Syrup of Senna, 0.5 m/m.

Oleum Fœniculi: Fennel Water, 0.2 m/m; Compound Powder of Glycyrrhiza, 0.4 per cent.; Compound Spirit of Juniper, 0.05 m/m.

Oleum Juniperi: Compound Spirit of Juniper, 0.4 m/m; Spirit of Juniper, 5 m/m.

Oleum Lavandulæ: Aromatic Spirit of Ammonia, 0.1 m/m; Compound Tincture of Lavender, 0.8 m/m, *q. v.*; Spirit of Lavender, 5 m/m; Liniment of Soft Soap, 2 m/m.

Oleum Limonis: Aromatic Spirit of Ammonia, 1 m/m, *q. v.*; Compound Spirit of Orange, 5 m/m, *q. v.*

Oleum Menthæ Piperitæ: Peppermint Water, 0.2 m/m; Spirit of Peppermint, 10 m/m; Compound Pills of Rhubarb, 0.5 m/n.

Oleum Menthæ Viridis: Spearmint Water, 0.2 m/m; Spirit of Spearmint, 10 m/m.

Oleum Myristicæ: Aromatic Spirit of Ammonia, 0.1 m/m, *q. v.*

Oleum Rosmarini: Compound Tincture of Lavender, 0.2 m/m, *q. v.*; Soap Liniment, 1 m/m, *q. v.*

Oleum Sassafras: Compound Syrup of Sarsaparilla, 0.02 m/m; Troches of Cubeb, 1 m/n.

Oleum Terebinthinæ: Cantharides Cerate, used 15 m/g; Turpentine Liniment, 35 per cent.; Rectified Oil of Turpentine, *q. s.*, *q. v.*

Oleum Terebinthinæ Rectificatum: Emulsion of Oil of Turpentine, 15 m/m.

OLEATA—OLEATES

Origin.—L. *oleic* + *ate*, a salt of oleic acid.

Pharmacopœial, 1; U. S. P. VIII, 5; N. F., 5.

Definition.—The Pharmacopœial oleates are semiliquid preparations for external use, made by dissolving bases (metallic oxides or alkaloids) in an excess of oleic acid.

Method of Preparation.—They are prepared by triturating the base in a warmed mortar with oleic acid until solution is effected.

Advantage of Class.—They are cleaner and more "elegant" preparations than ointments and are supposed to be more readily absorbed than either ointments or liniments. They are, however, more irritating than ointments.

Incompatibilities.—They are incompatible with the mineral acids.

Note: These liquid oleates should not be confused with the solid oleates which are chemically more nearly true oleates.

Preservation.—They should be preserved in closely covered glass containers, and should not be allowed to come in contact with metallic utensils.

Administration.—They are applied externally with inunction, like ointments.

OLEATUM HYDRARGYRI — Oleate of Mercury—**Oleat. Hydrarg.**

Preserve in tightly closed containers, protected from strong light. Do not dispense it if globules of mercury are visible at the bottom of the container.

Prepared by mixing 25 gm. yellow mercuric oxide with 20 mils alcohol in a tared dish, adding 75 gm. oleic acid and warmi the mixture to a temperature not exceeding 50° C., st constantly for five minutes; continuing the heat, and *occasionally* until the alcohol is expelled and the merc is dissolved; then adding enough oleic acid to make 100 gm. and mixing thoroughly.

In the preparation all contact with metallic utensils must be avoided. A higher temperature than prescribed causes reduction of the oxide and a consequent darkening of the preparation.

An ingredient in mass of mercury, 1 per cent., and in mercurial ointment, 2 per cent.

Mercurial alterative, preferred by some to the ointment of mercury. Used externally.

OLEORESINÆ—OLEORESINS

Origin.—L. *oleum*, oil + *resina*, resin. A mixture of natural oil and resin.

Pharmacopœial, 6; U. S. P. VIII, 6; N. F., 1.

Definition.—The Pharmacopœial oleoresins may be divided into two classes, natural and ungrouped, see page 203, and Pharmaceutic. Pharmaceutic oleoresins are thick semiliquid preparations consisting of oils, usually volatile, holding resins and other plant constituents in solution, prepared by extraction with appropriate solvents.

Method of Preparation.—They are prepared by evaporating an ethereal percolate from the respective powdered drug, except in the case of cubeb, where alcohol is used as the menstruum.

Advantage of Class.—They contain the active principles of their respective drugs in the highest degree of concentration.

Incompatibilities.—They are incompatible with aqueous liquids.

Preservation.—They are best preserved in wide-mouth, cork-stoppered bottles, in a cool place.

Administration.—They are best administered in the form of pills, capsules, or emulsions.

OLEORESINA ASPIDII—Oleoresin of Aspidium—Oleores. Aspid.—*Oleoresin of Male Fern*

Preserve in a well-stoppered bottle. Before dispensing, thor- [illegible] the liquid portion any granular deposit that [illegible]

[illegible] a suitable quantity of aspidium in [illegible] percolating it in a suitable percolator with ether. recovering the greater part of the ether by distillation, and allowing the remainder to evaporate spontaneously, in a warm place.

Yield of oleoresin, 10 to 15 per cent.

Teniafuge. Caution: *Single dose once a day*, 2 gm.

OREORESINA CAPSICI—Oleoresin of Capsicum—Oleores. Capsic.

Preserve in a well-stoppered bottle. Any separated fatty matter forming in this oleoresin is to be rejected.

Prepared by exhausting a suitable quantity of capsicum in No. 40 powder (500 gm.) by percolating it in a suitable percolator with ether, recovering the greater portion of the ether by distillation, allowing the remainder to evaporate spontaneously in a warm place, and finally passing the product through a pledget of purified cotton to remove separated fatty matter.

Yield of oleoresin, about 12 per cent.

An ingredient in capsicum plaster.

Externally, rubefacient; internally, stomachic, carminative. Dose, 30 mg.

OLEORESINA CUBEBÆ—Oleoresin of Cubeb—Oleores. Cubeb.

Preserve in a well-stoppered bottle. Only the liquid portion of this oleoresin should be dispensed.

Prepared by exhausting a suitable quantity of cubeb in No. 30 powder (500 gm.) by percolating it with alcohol, recovering the greater portion of the alcohol by distillation and allowing the remainder to evaporate spontaneously in a warm place, stirring frequently.

Yield of oleoresin, 18 to 25 per cent.

An ingredient in troches of cubeb, 2 g/n.

Blennorrhetic, diuretic, expectorant. Dose, 0.5 gm.

OLEORESINA PETROSELINI (IX)—Oleoresin of Parsley Fruit—Oleores. Petrosel.—*Liquid Apiol*

Preserve in a well-stoppered bottle.

Prepared by exhausting a suitable quantity of pars

No. 60 powder (500 gm.) by percolating it in colator with ether, recovering the greater portion of the ether by distillation and allowing the remainder to evaporate spontaneously in a warm place, stirring frequently; finally allowing the oleoresin to stand, without agitation, for four or five days, and then decanting the liquid portion.

Yield of oleoresin, 5 to 6 per cent.

Emmenagogue, diuretic. Dose, 0.5 mil.

OLEORESINA PIPERIS—Oleoresin of Pepper—**Oleores. Piper.**

Preserve in a well-stoppered bottle.

Prepared by exhausting a suitable quantity of pepper in No. 40 powder (500 gm.) by percolating it in a suitable percolator with ether, recovering the greater portion of the ether by distillation and allowing the remainder to evaporate spontaneously in a warm place, and the piperin to deposit; lastly separating the oleoresin from the piperin by straining it through purified cotton.

Yield of oleoresin, about 5 per cent.

Stomachic, carminative. Dose, 30 mg.

OLEORESINA ZINGIBERIS—Oleoresin of Ginger—**Oleores. Zingib.**

Preserve in a well-stoppered bottle.

Prepared by exhausting a suitable quantity of ginger in No. 60 powder (500 gm.) by percolating it in a suitable percolator with ether, recovering the greater portion of the ether by distillation and allowing the remainder to evaporate spontaneously in a warm place.

Yield of oleoresin, 8 to 12 per cent.

Stomachic, carminative. Dose, 30 mg.

OLEOSACCHARA, N. F.—OIL-SUGARS

Elæosacchara, (P. G.).

Origin.—Compound of L. *oleum*, oil + L. *saccharon*, sugar.

Definition.—Solid powdered preparations obtained by triturating together powdered sugar and volatile oil.

Method of Preparation.—Trituration, General Formula, N. [illegible] m/g.

Oxymellita, N. F.—Oxymels

Origin.—Gr. *oxos*, sour wine + *meli*, honey.

N. F., 1.

Definition.—Oxymels are liquid preparations consisting of mixtures of medicinal substances with vinegar (diluted acetic acid) and honey. Example: Oxymel of squill, N. F., made by mixing 50 gm. of vinegar of squill with 100 gm. of clarified honey and reducing the mixture by evaporation to 100 gm.

Pastæ Dermatologicæ, N. F.—Dermatologic Pastes

Origin.—L. *pasta*, paste; Gr. *derma*, skin + *logia*, speak.

Definition.—Soft, viscid, ointment-like preparations employed by dermatologists for external use, consisting of mixtures of starch, dextrin, zinc oxide, sulphur, etc., combined with glycerin, soft soap, petrolatum, lard, etc., and medicated with antiseptic or astringent agents.

Method of Preparation.—Incorporation.

Petroxolina, N. F.—Petroxolins

Origin.—Petrolatum.

N. F., 20.

Definition.—Petroxolins are liquid or semiliquid antiseptic preparations for external use, having as a "basis" liquid petrolatum in combination with ammonium oleate.

Pilulæ—Pills

Origin.—L. *pilula*, diminutive of *pila*, ball, hence a little ball.

Pharmacopœial, 7; U. S. P. VIII, 14; N. F., 30.

Definition.—Pills are solid, medicinal substances of convenient size and shape for swallowing, without previous mastication.

Methods of Preparation.—Pills are made by incorporation. The medicinal substances are intimately mixed in a mortar with a sufficient quantity of excipient to impart the necessary degree of adhesiveness, plasticity, and firmness. The mass thus produced is transferred to a pill tile and rolled into a cylinder. called a "pipe," of the proper size and length. The pipe then cut into segments of equal length which are given a sp form by rolling them between the thumb and fingers. U cial pills are frequently made by compression and such are usually called compressed pills. If these latter are not properly made they are not so readily disintegrated as those prepared from plastic masses.

Advantage of Class.—They afford a convenient way of administering medicinal substances in exact doses. They are easily and quickly administered and when coated are devoid of unpleasant taste.

Incompatibilities.—They are prescribed alone and hence have no incompatibilities.

Preservation.—Usually no special precautions are necessary. If uncoated and to be kept for some time, they should be kept in well-closed containers to prevent their drying and cracking.

Administration.—They are usually not administered in combination. They should be placed well back on the base of the tongue and swallowed with a draft of water. Their administration should be followed with at least half a glass of water to insure enough liquid in the stomach to cause rapid disintegration. As a general rule they should not be prescribed for children, as they find it difficult or impossible to swallow them.

Size and Shape.—Pills may be spheric, ovoid or lenticular, and range in diameter from 1 to 10 mm. and in weight from 0.1 to 0.5 gm. Very small pills, weighing from 0.03 to 0.1 gm., are called granules or parvules. A very large pill, 0.5 gm. or more in weight, is called a bolus.

Excipients.—The term "excipient" is applied to the substance which imparts or develops the necessary adhesiveness and plasticity to the medicinal substances which are to be formed into pills. The nature of the excipient varies with the physical properties of the drug. For the Pharmacopœial pills soap, water, diluted alcohol, confection of rose, syrup, acacia, and tragacanth are used. The choice of an excipient for the extemporaneous preparation of pills requires considerable judgment and knowledge of the nature of the ingredients to be massed. Glucose and glycerite of tragacanth are two excipients which have a wide range of usefulness. Wheat flour is a good excipient for massing oils and other liquids, yellow wax

purpose. A combination of wheat

ipient for liquids has points of

advantage over either one, used alone. This wax or wax mixture is melted, and when it has cooled to the proper consistency, incorporated with the medicament.

Potassium permanganate and silver nitrate are best massed with a mixture of white petrolatum and paraffin, and if desired the mass may be stiffened with kaolin or talc.

Coating.—Pills are coated with such substances as gelatin, sugar, chocolate, and gold or silver leaf. The coating mproves the palatability and general appearance of the pill, though at the same time it retards somewhat its disintegration in the system. Pills are sometimes coated with salol or with keratin, a substance prepared from feathers, for the purpose of preventing their disintegration in the stomach, so that they may arrive in the intestines intact, where the alkaline secretions will accomplish their disintegration; such pills are sometimes called "enteric pills." They may be coated by rolling them in melted salol.

Diluents.—It is sometimes desirable to increase the size of the pill, and in such cases powdered extract of liquorice or finely powdered liquorice root is recommended.

Conspergatives.—Extemporaneous pills are usually rolled in or surrounded by a powder to prevent their adhesion to one another or to the container. If properly made, pills should not require this, but when they must be dispensed immediately, it is desirable to use some suitable powdered substance. For white pills use a white conspergative, powdered cane-sugar or flour. For dark pills use a dark colored conspergative, as powdered extract of liquorice, powdered liquorice root, or lycopodium, as suggested from the color of the pill.

PILULÆ ALOES—Pills of Aloes—Pil. Aloes

Prepared by massing 13 gm. aloes and 13 gm. powdered soap with sufficient water and dividing into 100 pills.

Cathartic, emmenagogue. Dose, 2 pills.

PILULÆ ASAFŒTIDÆ—Pills of Asafetida—Pil. Asafœ

Prepared by massing 20 gm. asafetida and 6 gm. p soap with sufficient water and dividing into 100 pills.

Carminative, antispasmodic, antihysteric. Dose.

PILULÆ CATHARTICÆ COMPOSITÆ—Compound Cathartic Pills—Pil. Cathart. Co.

Prepared by massing 8 gm. compound extract of colocynth, 6 gm. mild mercurous chloride, 2 gm. resin of jalap, 1.5 gm. gamboge with a sufficient quantity of diluted alcohol and dividing into 100 pills.

Cathartic. Dose, 2 pills.

PILULÆ FERRI CARBONATIS—Pills of Ferrous Carbonate—Pil. Ferr. Carb.—*Chalybeate Pills; Blaud's Pills; Ferruginous Pills*

Each pill contains 0.06 gm. $FeCO_3$.

Prepared by rubbing 8 gm. potassium carbonate, in a mortar, with about 5 drops each of glycerin and water, then adding 16 gm. ferrous sulphate and 4 gm. sugar which have previously been triturated together to a fine powder, and rubbing the mass thoroughly until it assumes a greenish color. After the reaction is completed, adding 1 gm. powdered tragacanth, 1 gm. powdered althæa, and if necessary a little more water to obtain a pilular mass, and dividing into 100 pills. If desired, the potassium carbonate may be replaced by 7.2 gm. monohydrated sodium carbonate.

Chemical Reaction:

$$FeSO_4.7H_2O + K_2CO_3 = FeCO_3 + K_2SO_4 + 7H_2O$$

Hematinic. Dose, 2 pills.

PILULÆ FERRI IODIDI—Pills of Ferrous Iodide—Pil. Ferr. Iod.

Pills of ferrous iodide are free from the odor of iodine.

Preserve in a well-stoppered bottle.

Prepared by adding 6 mils water to 4 gm. reduced iron, contained in a small mortar, and then gradually adding 5 gm. iodine, stirring constantly until the liquid ceases to have a reddish tint; then adding 4 gm. powdered glycyrrhiza, 4 gm. powdered sugar, 1 gm. powdered extract of glycyrrhiza, and 1 gm. powdered acacia, previously well triturated together, and mixing [illegible] thoroughly; transferring the mass to a porcelain dish, evaporating off the excess of moisture on a water-bath, reducing to a pilular consistency, and dividing into 100 pills.

Lastly coat the pills, enough to prevent oxidation, by rolling them in a solution of 10 gm. balsam of tolu in 15 mils ether, and dry.

Alterative, hematinic. Dose, 2 pills.

PILULÆ PHOSPHORI—Pills of Phosphorus—**Pil. Phosphor.**

Preserve in a well-stoppered bottle.

Prepared by mixing 6 gm. powdered althæa and 3 gm. powdered acacia in a mortar with a solution of 0.06 gm. phosphorus in 5 mils chloroform and immediately following with a sufficient quantity of a mixture of glycerin and water (2 to 1) to form a mass, and dividing into 100 pills.

Lastly coat the pills, enough to prevent oxidation of the phosphorus, by rolling them in a solution of 10 gm. balsam of tolu in 15 mils ether, and dry.

Tonic, alterative. Dose, 1 pill.

PILULÆ RHEI COMPOSITÆ—Compound Pills of Rhubarb—**Pil. Rhei Co.**

Prepared by massing 13 gm. powdered rhubarb, 10 gm. powdered aloes, 6 gm. powdered myrrh, and 0.5 mil oil of peppermint with a sufficient amount of water, and dividing into 100 pills.

Tonic, laxative. Dose, 2 pills.

PINGUIA (ADIPES)—FATS

Origin.—L. *pinguis*, fat; L. *adeps*, fat, especially lard.

Pharmacopœial, 8 (omitting benzoinated lard and oil of theobroma); U. S. P. VIII, 8; N. F., none. They are not grouped in the U. S. P.

Definition.—Solid or semisolid substances having rat
melting-points, unctuous to the touch, which produc
a greasy stain which is not removed by heating
with water. Compare *Fixed Oils*, page 355.

Composition.—They resemble the fixed oils in composition, but the percentage of stearin in them is greater or else their constituents have a greater number of carbon atoms in their molecules.

Methods of Preparation.—They are prepared by melting and straining or by hot expression, or by chilling and pressing.

Incompatibilities.—Those of organic origin should not be compounded with oxidizing agents, and if they consist of glycerides, caustic alkalies will decompose them (saponification) and, like the fixed oils, they are prone to become rancid.

Preservation.—Owing to their tendency to become rancid they should be kept in dry, moderately cold places and in small, well-closed containers.

Administration.—They are usually used externally, and most generally compounded into ointments.

ADEPS—Lard

The prepared internal fat of the abdomen of the hog, purified by washing with water, melting, and straining. It consists chiefly of glycerides, stearin, and olein.

Preserve in well-closed containers impervious to fat, and in a cool place.

White, soft, unctuous solid, lighter than water; m. p. 36° to 42° C., faint odor, free from rancidity; bland taste.

Neutral in reaction; insoluble in water; very slightly soluble in alcohol; readily soluble in ether, carbon disulphide, or benzin.

Obtained from the flaky masses of fat which surround the kidneys. It is first cleansed with water, the discolored patches and adhering membranes removed, and then dried in a current of air to remove any moisture which would have a tendency to promote the decomposition of the lard. The dry fat is then finely minced and afterward melted in a water-jacketed vessel at a temperature not above 57° C., and finally strained through muslin or cotton flannel. The strained liquid should be rapidly cooled and stirred until cold to render it soft and creamy.

[illegible] zoinated lard, *q. v.*; rosin cerate, 50 per cent. Used in making lead plaster, [illegible] 76 per cent.

ADEPS BENZOINATUS—Benzoinated Lard—**Adeps Benz.**

Lard impregnated with the odorous and preservative principles of Siam benzoin. In all other respects corresponding to lard.

Preserve in a cool place in well-closed containers which are impervious to fat.

Prepared by mixing 1 gm. of coarsely powdered Siam benzoin with 100 gm. of lard, melting and heating the mixture on a water-bath at a temperature not exceeding 60° C., stirring frequently for two hours, then straining it through muslin and stirring it occasionally until cold.

In very warm weather it is permitted to replace 5 gm. of the lard, or more if necessary, with an equal weight of white wax.

An ingredient in cerate, 70 per cent.; cantharidal cerate, 20 per cent., *q. v.*; ointment, 80 per cent., *q. v.*; belladonna ointment, 55 per cent.; chrysarobin ointment 94 per cent.; iodine ointment, 80 per cent.; iodoform ointment, 90 per cent.; mercurial ointment, 25 per cent., *q. v.*; stramonium ointment, 65 per cent.; sulphur ointment, 85 per cent.; ointment of zinc oxide, 80 per cent.

ADEPS LANÆ—Wool Fat—**Adeps Lan.**—*Anhydrous Lanolin*

The purified fat of the wool of the sheep, freed from water.

Preserve in a cool place in well-closed containers which are impervious to fat.

Light yellow, tenacious, unctuous mass, melting between 38° to 42° C., having not more than a slight odor.

Insoluble in but miscible with two to three times its weight of water. Sparingly souble in alcohol, freely soluble in ether and chloroform.

Obtained by treating the crude wool fat with weak alkali which saponifies the free fatty acids. The nearly pure wool fat is then separated by centrifuging the resulting emulsion-like mixture, after which it is partially dehydrated by mixing it with calcium chloride, and the dehydrating completed by fusing it in the presence of quicklime. The pure wool fat is extracted from this mixture with acetone, which upon distillation leaves the purified anhydrous wool fat as a residue.

Wool fat is composed chiefly of cholesterin compounds which would place it chemically with the waxes rather than with the true fats, which are regarded as glycerides.

It is used as a basic ingredient in ointments, particularly where aqueous liquids are to be incorporated.

ADEPS LANÆ HYDROSUS—Hydrous Wool Fat—Adeps Lan. Hyd.—*Lanolin*

The purified fat of the wool of the sheep combined with 25 to 30 per cent. of water.

Preserve in a cool place in well-closed containers which are impervious to fat.

Yellowish-white or nearly white ointment-like mass, having not more than a slight odor.

Neutral in reaction, insoluble in alcohol, and yielding turbid solutions with ether and chloroform.

Used as an ointment base. It does not become rancid and is more indifferent, chemically, than lard.

An ingredient in belladonna ointment, 30 per cent.; ointment of ammoniated mercury, 40 per cent.; ointment of yellow oxide of mercury, 40 per cent.; stramonium ointment, 20 per cent.

Cetaceum, see page 230.
Oleum Theobromatis, see page 357.
Paraffinum, see page 252.
Petrolatum, see page 254.
Petrolatum Album, see page 255.

SEVUM PRÆPARATUM—Prepared Suet—Sev. Præp.—*Mutton Suet*

The internal fat of the abdomen of the sheep, purifi melting and straining.

Preserve in a cool place in well-closed vessels im

Becomes rancid on prolonged exposure to be used after it has become rancid.

White, solid fat, melting between 45° a gealing between 37° and 40° C.; nearly in when fresh.

colator with ether, recovering the greater part of the ether by distillation, and allowing the remainder to evaporate spontaneously, in a warm place.

Yield of oleoresin, 10 to 15 per cent.

Teniafuge. Caution: *Single dose once a day*, 2 gm.

OREORESINA CAPSICI—Oleoresin of Capsicum—Oleores. Capsic.

Preserve in a well-stoppered bottle. Any separated fatty matter forming in this oleoresin is to be rejected.

Prepared by exhausting a suitable quantity of capsicum in No. 40 powder (500 gm.) by percolating it in a suitable percolator with ether, recovering the greater portion of the ether by distillation, allowing the remainder to evaporate spontaneously in a warm place, and finally passing the product through a pledget of purified cotton to remove separated fatty matter.

Yield of oleoresin, about 12 per cent.

An ingredient in capsicum plaster.

Externally, rubefacient; internally, stomachic, carminative. Dose, 30 mg.

OLEORESINA CUBEBÆ—Oleoresin of Cubeb—Oleores. Cubeb.

Preserve in a well-stoppered bottle. Only the liquid portion of this oleoresin should be dispensed.

Prepared by exhausting a suitable quantity of cubeb in No. 30 powder (500 gm.) by percolating it with alcohol, recovering the greater portion of the alcohol by distillation and allowing the remainder to evaporate spontaneously in a warm place, stirring frequently.

Yield of oleoresin, 18 to 25 per cent.

An ingredient in troches of cubeb, 2 g/n.

Blennorrhetic, diuretic, expectorant. Dose, 0.5 gm.

OLEORESINA PETROSELINI (IX)—Oleoresin of Parsley Fruit—Oleores. Petrosel.—*Liquid Apiol*

Preserve in a well-stoppered bottle.

Prepared by exhausting a suitable quantity of parsley fruit in *No. 60* powder (500 gm.) by percolating it in a suitable percolator with ether, recovering the greater portion of the ether by distillation and allowing the remainder to evaporate spontaneously in a warm place, stirring frequently; finally allowing the oleoresin to stand, without agitation, for four or five days, and then decanting the liquid portion.

Yield of oleoresin, 5 to 6 per cent.

Emmenagogue, diuretic. Dose, 0.5 mil.

OLEORESINA PIPERIS—Oleoresin of Pepper—**Oleores. Piper.**

Preserve in a well-stoppered bottle.

Prepared by exhausting a suitable quantity of pepper in No. 40 powder (500 gm.) by percolating it in a suitable percolator with ether, recovering the greater portion of the ether by distillation and allowing the remainder to evaporate spontaneously in a warm place, and the piperin to deposit; lastly separating the oleoresin from the piperin by straining it through purified cotton.

Yield of oleoresin, about 5 per cent.

Stomachic, carminative. Dose, 30 mg.

OLEORESINA ZINGIBERIS—Oleoresin of Ginger—**Oleores. Zingib.**

Preserve in a well-stoppered bottle.

Prepared by exhausting a suitable quantity of ginger in No. 60 powder (500 gm.) by percolating it in a suitable percolator with ether, recovering the greater portion of the ether by distillation and allowing the remainder to evaporate spontaneously in a warm place.

Yield of oleoresin, 8 to 12 per cent.

Stomachic, carminative. Dose, 30 mg.

OLEOSACCHARA, N. F.—OIL-SUGARS

Elæosacchara, (P. G.).

Origin.—Compound of L. *oleum*, oil + L. *saccharon*, sugar.

Definition.—Solid powdered preparations obtained by triturating together powdered sugar and volatile oil.

Method of Preparation.—Trituration, General Formula, N. F., *strength*, 2 m/g.

contents of the blue paper in $\frac{1}{2}$ glass of water and the contents of the white paper in $\frac{1}{4}$ glass of water, mix the two solutions, and drink while effervescing.

PULVIS GLYCYRRHIZÆ COMPOSITUS—Compound Powder of Glycyrrhiza—**Pulv. Glycyrrh. Co.**—*Compound Licorice Powder*

Preserve in well-closed containers. Exposure to air and moisture develops an odor of hydrogen sulphide, rendering the powder unfit for use.

A greenish-yellow to greenish-brown powder having a fennel-like odor.

Prepared by mixing intimately 18 gm. senna and 23.6 gm. glycyrrhiza, both in No. 80 powder, with 8 gm. washed sulphur; 0.4 gm. oil of fennel and 50 gm. powdered sugar, and passing the mixture through a No. 80 sieve.

Laxative. Dose, 4 gm.

PULVIS IPECACUANHÆ ET OPII—Powder of Ipecac and Opium—**Pulv. Ipecac. et Opii**—*Compound Powder of Ipecac; Dover's Powder*

Prepared by triturating together 10 gm. each of powdered opium and powdered ipecac and 80 gm. sugar of milk in No. 30 powder until they are reduced to a very fine uniform powder.

Anodyne, diaphoretic. Dose, 0.5 gm.

PULVIS JALAPÆ COMPOSITUS—Compound Powder of Jalap—**Pulv. Jalap. Co.**—*Pulvis Purgans*

Prepared by intimately mixing together, by trituration, 35 gm. powdered jalap and 65 gm. powdered potassium bitartrate, and passing the product through a No. 60 sieve.

Hydragogue cathartic. Dose, 2 gm.

PULVIS RHEI COMPOSITUS—Compound Powder of Rhubarb—**Pulv. Rhei Co.**—*Gregory's Powder*

Prepared by triturating together 25 gm. powdered rhu and 10 gm. powdered jamaica ginger, then gradually a

65 gm. magnesium oxide, continuing the triturating until they are thoroughly mixed, and lastly passing the ingredients through a No. 60 sieve.

Laxative, antacid. Dose, 2 gm.

RESINÆ—RESINS

Origin.—L. *resina*, resin.

Pharmacopœial, 4; U. S. P. VIII, 4; N. F., 0.

Definition.—The Pharmacopœial resins may be divided into two classes, natural and ungrouped, see page 204, and Pharmaceutic.

Pharmaceutic resins are solid substances of vegetable origin having a very complex composition and characterized by being readily soluble in alcohol, but insoluble in water.

Methods of Preparation.—Some are prepared by separating the resin from natural oleoresins by distillation, as, for example, rosin; but the greater number are prepared by extracting the resinous constituents from powdered vegetable drugs by percolating with alcohol, recovering the greater part of the alcohol by distillation, and precipitating the resin from the concentrated residue by the addition of water.

Advantage of Class.—They present in highly concentrated form the active principle or principles of the drug from which they are derived.

Incompatibilities.—Their form and method of administration is such that they have no incompatibilities.

Preservation.—They are best kept in amber-colored, closely stoppered bottles.

Administration.—They are usually administered in pill or tablet form, but may also be administered in powdered form.

RESINA—Rosin—**Resin.**—*Colophony*

Occurs usually in sharp, angular, transparent, amber-colored fragments, frequently covered with yellow dust, sp. gv. 1.07 to 1.09, brittle at the ordinary temperature, fracture shiny and conchoidal; odor and taste slightly terebinthinate.

The alcoholic solution is acid to litmus. Insoluble in water, freely soluble in alcohol.

Obtained as the residue (by-product) from the stills in the production of oil of turpentine.

An ingredient in resin plaster, 14 per cent.

An ingredient in many ointments and plasters, but rarely used internally.

RESINA JALAPÆ—Resin of Jalap—**Res. Jalap.**

Permanent in the air.

Occurs in yellow to brown colored masses or fragments, breaking with a resinous, glassy fracture, and translucent at the edges, or as a yellowish-gray to yellowish-brown powder, having a slight, peculiar odor, and a somewhat acrid taste.

The alcoholic solution is faintly acid to litmus. Insoluble in water, soluble in alcohol in all proportions.

Prepared by extracting a sufficient quantity of jalap in No. 60 powder (1000 gm.) by percolating it with alcohol, recovering the greater portion of the alcohol by distillation, while reducing the residue to 250 gm., then adding the residue with constant stirring to 3000 mils of water, washing the subsided precipitate several times by decantation, using hot water, lastly draining the precipitate and heating it to dryness on the water-bath.

An ingredient in compound cathartic pills, 2 g/n.

Purgative Dose, 125 mg.

RESINA PODOPHYLLI—Resin of Podophyllum—**Res. Podoph.**—*Podophyllin*

Seventy-five per cent. soluble in ether and 65 per cent. soluble in chloroform. Darkens when exposed to heat above 25° C. or when exposed to the light.

Preserve in well-closed containers protected from light.

Occurs as an amorphous powder varying in color from light brown to greenish-yellow, having a slight, peculiar odor, and a faintly bitter taste. The powder is very irritating to mucous membrane, especially that of the eye.

The alcoholic solution is faintly acid to litmus. Insolub water, readily soluble in alcohol.

Prepared by extracting a sufficient quantity of podop in No. 60 powder (1000 gm.) by percolating with alcohol, distilling off the greater portion of the alcohol, and pouring the syrupy residue, with constant stirring, into 1000 mils of water, having a temperature not above 10° C., to which has previously been added 10 mils hydrochloric acid, washing the precipitate by decantation with cold water, lastly draining it on a muslin strainer and drying it by exposure to the air in a cool place, protected from the light.

Powerful cathartic. Dose, 10 mg.

RESINA SCAMMONIÆ—Resin of Scammony—**Res. Scamm.**

Not less than 95 per cent. soluble in ether, distinction from resin of jalap and resin of false scammony.

Occurs as brownish, translucent masses or fragments, breaking with a glossy, resinous fracture; characteristic, fragrant odor; slightly acrid taste.

Insoluble in water, soluble in alcohol in all proportions.

Prepared by extracting a sufficient quantity of scammony root in No. 30 powder (1000 gm.) by percolating with alcohol, recovering the greater portion of the alcohol by distillation, and pouring the syrupy residue, with constant stirring, into 1000 mils of hot water, washing the residue repeatedly with hot water, and lastly drying it on a water-bath.

An ingredient in compound extract of colocynth, 14 per cent.

Drastic cathartic. Dose, 200 mg.

SALIA EFFERVESCENTIA, N. F.—GRANULAR EFFERVESCENT SALTS

PULVERES EFFERVESCENTES—EFFERVESCENT POWDERS

Origin.—L. *sal*, salt; L. *effervescere*, foam up.

Pharmacopœial, not classified, 3; U. S. P. VIII, 5; N. F. (classified), 7.

Definition.—Effervescent salts are mixtures of soluble salts with sodium bicarbonate and citric or tartaric acids, or a mixture of the two acids, designed [illegible] rvescing drafts when added to water.

Methods [illegible] two kinds, powdere [illegible]

Effervescent powders are prepared by trituration and consist of combinations of thoroughly dried salts with a sufficient quantity of thoroughly dried sodium bicarbonate and organic acid to produce the desired amount of effervescence. Sugar is sometimes added to give bulk.

A **granular effervescent salt** may be prepared from an effervescent powder by adding sufficient alcohol to it to make it cohere and then forcing the mass through a No. 6 tinned iron sieve, and drying it rapidly at a gentle heat. Owing to the expense of the alcohol the granulation is usually accomplished by warming the ingredients either in an oven or over the water-bath until pasty, which condition is caused by the liberation of the water of crystallization from the citric acid, which for this purpose should be uneffloresced, and then forcing it through a sieve and drying as in the alcohol method.

Advantage of Class.—They afford a carbonated draft which is very acceptable to the stomach, and at the same time the slight acidity masks to a certain extent the saline taste of the basis.

Incompatibilities.—They are not prescribed in combination.

Preservation.—They should be preserved in well-stoppered bottles to exclude moisture.

Administration.—They are added to a rather large bulk of water and drunk while effervescing.

CAFFEINA CITRATA EFFERVESCENS—Effervescent Citrated Caffeine—**Caff. Cit. Eff.**

Contains not less than 1.9 per cent. of anhydrous caffeine. Prepared from citrated caffeine, 4 per cent., the remainder consisting of sodium bicarbonate, tartaric and citric acids.

Heart stimulant, diuretic, respiratory stimulant, nerve stimulant.

Used to relieve neuralgic headache.

Dose, 4 gm.

POTASSII CITRAS EFFERVESCENS—Effervescent Potassium Citrate—**Pot. Cit. Eff.**

Preserve in air-tight containers.

A coarse, granular powder.

Prepared by granulating an intimate mixture of 20 gm. potassium citrate, 47.7 gm. dried sodium bicarbonate, 25.2 gm. dried and powdered tartaric acid, and 16.2 gm. uneffloresced crystals of citric acid. To make about 100 gm.

Diuretic, antirheumatic. Dose, 4 gm.

SAL LITHII CITRATIS EFFERVESCENS, N. F.—Effervescent Salt of Lithium Citrate—**Sal. Lith. Cit. Eff.**—*Lithii Citras Effervescens*, U. S. P. VIII; *Effervescent Lithium Citrate*

Loses carbon dioxide when exposed to moist air.

Preserve in an air-tight container.

White, coarse, granular powder; odorless; cooling, acidulous, saline taste.

Acid to litmus. Soluble in water with effervescence; incompletely soluble in alcohol.

Prepared by granulating, by the general process, a mixture consisting of lithium citrate, 5; sodium bicarbonate, 57; tartaric acid, 30; citric acid, 19.5. To make about 100 gm.

More agreeable to the taste than lithium citrate.

Antirheumatic, diuretic. Dose, 8 gm.

SODII PHOSPHAS EFFERVESCENS—Effervescent Sodium Phosphate—**Sod. Phos. Eff.**

A granular salt obtained by granulating a mass, softened by heating, composed of dried exsiccated sodium phosphate, 20 per cent.; dried sodium bicarbonate, 47.7 per cent.; dried tartaric acid, 25.2 per cent., and uneffloresced citric acid, 16.2 per cent.

Cathartic. Dose, 10 gm.

SERA—SERUMS

Origin.—L. *serum*, whey, the liquid portion of any complex fluid.

Pharmacopœial, 2, with three titles each; U. S. P. VIII, 1; N. F., none.

De an animal which has been
by injections of increas-
disease.

Methods of Preparation.—The details of the methods vary somewhat, depending upon the nature of the serum prepared. For antidiphtheric serum the method may be outlined as follows: A culture of the pure diphtheria bacillus is first obtained by growing the germs on blood-serum culture-medium and separating them from contaminating organisms by appropriate means. The pure culture is then transferred to a bouillon medium and incubated at a temperature of 37° C. After about two weeks the germs are removed by filtration through a porcelain filter, leaving the bouillon rich in diphtheria toxin. This bouillon is then injected into sound, healthy horses, beginning with a very small dose, which may be as small as 0.05 mil. The toxin produces reactions in the horse similar to the disease, and the blood of the horse resists by forming antibodies. When the effects of the first dose have passed off, a larger dose is injected, and the process repeated until the horse is able to stand enormous doses of the toxin, often as large as 350 mils, without serious reaction. When the resisting powers of the horse have been fully developed, which usually requires about six weeks, the animal is allowed to rest eight to ten days, during which time all traces of the toxin are eliminated. The horse is then bled from the jugular vein under aseptic conditions, and the blood collected in sterile glass containers. After standing twenty-four to forty-eight hours the blood-clot separates from the serum, and the latter, which contains the antibodies, is poured from the clot and clarified by filtration through a porcelain filter. A preservative, usually tricresol (0.4 per cent.), is added just before filtration, and the serum is tested for contaminating organisms. The serum is now ready for standardization.

This is done by testing its neutralizing value against diphtheria toxin, the standard unit of which is fixed by the U. S. Government and is approximately 100 times the amount fatal to a 250-gm. guinea-pig. The smallest quantity that will protect the life of a 250-gm. guinea-pig for four days against the test dose of toxin is called one antitoxic unit; in other words, it is 100 times the strength of toxin necessary to kill a 250-gm. guinea-pig in four days.

Only such sera may be sold as have been prepared and propagated in establishments licensed by the Secretary of the Treasury of the United States. The United States law requires that each container of serum sold by licensed establishments shall bear upon the label, in addition to the name of the serum, the name, address, and license number of the manufacturer, and the date beyond which the product cannot be expected to yield its specific results. The label must also contain the laboratory number of the serum, the name and percentage by volume of the antiseptic used (if any), and the total number of antitoxic units claimed for the contents of the container.

Advantage of Class.—They constitute one of the most important classes of remedial agents. They are specific in certain cases, also prophylactic and diagnostic.

Incompatibilities.—They are not administered in combination.

Preservation.—They are best preserved in small, hermetically sealed bottles of hard glass, called ampules, and kept in a refrigerator.

Administration.—They are administered hypodermically.

SERUM ANTIDIPHTHERICUM—Antidiphtheric Serum—Ser. Antidiph.—*Diphtheria Antitoxin*

A fluid having a potency of not less than 250 antitoxic units per mil, separated from the coagulated blood of the horse (*Equus Caballus*, Linné), which has been properly immunized against diphtheria toxin. The deterioration is from 10 to 30 per cent. per year, and a serum of lower potency than 250 units per mil must not be sold or dispensed. Preserve in sealed glass containers, at a temperature between 4.5° and 15° C., protected from light.

A yellowish or yellowish-brown, transparent or slightly turbid liquid, with sometimes a slight, granular sediment; odorless or having an odor due to the presence of preservative.

Antidiphtheric. Curative dose, 10,000 units; protective, 1000 units.

SERUM ANTIDIPHTHERICUM PURIFICATUM (IX)—Purified Antidiphtheric Serum—**Ser. Antidiph. Purif.**—*Antidiphtheric Globulins; Concentrated Diphtheria Antotixin; Diphtheric Antitoxin Globulins; Refined and Concentrated Diphtheria Antitoxin*

A solution in physiologic solution of sodium chloride of certain proteins obtained from the blood-serum or plasma of the horse, which has been properly immunized against diphtheria toxin. Must be kept in sealed glass containers in a dark place at a temperature between 4.5° and 15° C. Serum of lower potency than 250 units per mil must not be sold or dispensed.

A transparent or slightly opalescent liquid, with sometimes a slight granular or ropy deposit, odorless, or having an odor due to the presence of preservative.

Obtained in the following manner: After the serum from the immunized horse has been collected the antitoxin-bearing globulins are precipitated with ammonium sulphate, the precipitate is separated and dissolved in saturated sodium chloride solution, and the salts are then separated by dialysis. After the dialysis is complete sufficient sodium chloride is added to make a 0.6 to 0.9 per cent. solution of the salt.

Antidiphtheric. Curative dose, 10,000 units; protective, 1000 units.

SERUM ANTIDIPHTHERICUM SICCUM (IX)—Dried Antidiphtheric Serum—**Ser. Antidiph. Sicc.**—*Dried Diphtheria Antitoxin*

Dried antiseptic serum if preserved as directed does not lose its potency as does the liquid serum.

It must have a potency of not less than 4000 units per gm. Preserve in hermetically sealed, amber-colored, glass containers, free from air, in a dark place, at a temperature between 4.5° and 15° C.

Occurs as either orange or yellowish colored flakes or small lumps, or as a yellowish-white powder, without odor.

Obtained by evaporating either antidiphtheric serum or r
fied antidiphtheric serum in a vacuum over sul
by passing over it a current of warm air freed

Prepared for use by dissolving in recently boiled and cooled distilled water, preferably in the original container, and under the most rigid aseptic conditions.

Antidiphtheric. Curative dose, 10,000 units; protective, 1000 units.

SERUM ANTITETANICUM (IX)—Antitetanic Serum—Ser. Antitetan.—*Tetanus Antitoxin*

A fluid separated from the coagulated blood of the horse (*Equus Caballus*, Linné) which has been properly immunized against tetanus toxin.

The standard of strength, expressed in units of antitoxic power, shall not be less than 100 units per mil.

Preserve in sealed glass containers at a temperature between 4.5° and 15° C., protected from light.

Occurs as a yellowish or yellowish-brown, transparent, or slightly turbid liquid, with sometimes a slight granular deposit; odorless or having an odor due to the preservative.

Antitetanic. Curative dose, 10,000 units protective, 1500 units.

SERUM ANTITETANICUM PURIFICATUM (IX)—Purified Antitetanic Serum—Ser. Antitetan. Purif.—*Antitetanic Globulins; Concentrated Tetanus Antitoxin; Refined and Concentrated Tetanus Antitoxin; Tetanus Antitoxin Globulins*

A solution in physiologic solution of sodium chloride of certain antitoxic proteins obtained from the blood-serum of the horse which has been properly immunized against tetanus toxin. It corresponds in potency to antitetanic serum.

Preserve in sealed glass containers at a temperature between 4.5° and 15° C., protected from light.

Occurs as a transparent or slightly opalescent liquid, with sometimes a slight granular or ropy deposit; odorless or having an odor due to preservative.

Obtained as follows: After the serum from the immunized horse has been collected, the antitoxin-bearing globulins are [illegible] with ammonium sulphate, the precipitate is sepa- [illegible] ved in saturated sodium chloride solution, and

the salts are then separated by dialysis. After dialysis is complete sufficient sodium chloride is added to make a 0.6 to 0.9 per cent. solution of the salt.

Antitetanic. Curative dose, 10,000 units; protective, 1500 units.

SERUM ANTITETANICUM SICCUM (IX)—Dried Antitetanic Serum—Ser. Antitetan. Sicc.—*Dried Tetanus Antitoxin*

It must comply with the requirements for control, labeling, and potency expressed for serums. It has a potency of not less than 1000 units per gm.

Dried antitetanic serum if kept as directed does not lose its potency as does the liquid serum.

Preserve in hermetically sealed, amber-colored glass containers, free from air, at a temperature between 4.5° and 15° C., in a dark place.

Occurs either in the form of orange or yellowish flakes or small lumps, or as a yellowish-white powder, without odor.

Soluble in 9 parts of water, the solution being opalescent and slightly viscous.

Obtained by evaporating either antitetanic serum or purified antitetanic serum in a vacuum over sulphuric acid or by passing over it a current of warm air freed from bacteria.

Prepared for use by dissolving in recently boiled and cooled distilled water, preferably in the original container, and under the most rigid aseptic conditions.

Antitetanic. Sometimes used as a dusting-powder or for local application to infected wounds. Curative dose, 10,000 units; protective, 1500 units.

SPECIES, N. F.—SPECIES (TEAS)

Origin.—L. *species.*

N. F., 3.

Definition.—Mixtures of coarsely comminuted or bruised drugs, consisting usually of the softer parts of plants and intended to be used in making poultices, baths, and infusions (teas).

Method of Preparation.—The drugs are either cut, coarsely powdered, or bruised, and intimately mixed.

Advantage of Class.—They furnish combinations convenient for the preparation of medicines.

Preservation.—Keep in cartons and protect from insects.

Administration.—They may, according to character, be used as poultices or administered as infusions or extracted by maceration in spirituous liquors and used as "bitters."

SPIRITUS—SPIRITS

Origin.—L. *spiritus*, the breath of life.

Pharmacopœial, 15; U. S. P. VIII, 25; N. F., 9.

Definition.—Spirits are alcoholic solutions of volatile substances, usually volatile oils.

Methods of Preparation.—They are prepared by: I. Simple solution. II. Simple solution, including chemical reaction: Spiritus Ætheris Nitrosi and Spiritus Ammoniæ Aromaticus. III. Simple solution, including maceration: Spiritus Menthæ Piperitæ and Spiritus Menthæ Viridis.

The herb is macerated in order to impart the characteristic color to the preparation in deference to the wishes of the users, who demand a preparation having the characteristic color of the drug. This is doubtless due to the well-established but erroneous idea that the strength of a preparation is proportional to its color.

Advantage of Class.—They are stronger than the waters and are not only useful in flavoring, but may be used as medicaments.

Incompatibilities.—As a rule aqueous liquids cause a precipitation of the oil. The alcohol may also precipitate inorganic salts from aqueous solutions.

Preservation.—They should be kept in well-closed bottles in a cool place, protected from the light.

Administration.—They are too strongly alcoholic to be administered without dilution. They may be administered in water, sweetened water, or may be dropped on lump sugar.

Note.—The Pharmacopœial spirits are, as a rule, stronger than the spirits, essences, and extracts used for flavoring foods. Thes latter generally contain only enough alcohol to hold the fl ing principles in solution, and when labeled so a

the salts are then separated by dialysis. After dialysis is complete sufficient sodium chloride is added to make a 0.6 to 0.9 per cent. solution of the salt.

Antitetanic. Curative dose, 10,000 units; protective, 1500 units.

SERUM ANTITETANICUM SICCUM (IX)—Dried Antitetanic Serum—Ser. Antitetan. Sicc.—*Dried Tetanus Antitoxin*

It must comply with the requirements for control, labeling, and potency expressed for serums. It has a potency of not less than 1000 units per gm.

Dried antitetanic serum if kept as directed does not lose its potency as does the liquid serum.

Preserve in hermetically sealed, amber-colored glass containers, free from air, at a temperature between 4.5° and 15° C., in a dark place.

Occurs either in the form of orange or yellowish flakes or small lumps, or as a yellowish-white powder, without odor.

Soluble in 9 parts of water, the solution being opalescent and slightly viscous.

Obtained by evaporating either antitetanic serum or purified antitetanic serum in a vacuum over sulphuric acid or by passing over it a current of warm air freed from bacteria.

Prepared for use by dissolving in recently boiled and cooled distilled water, preferably in the original container, and under the most rigid aseptic conditions.

Antitetanic. Sometimes used as a dusting-powder or for local application to infected wounds. Curative dose, 10,000 units; protective, 1500 units.

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Origin.—L. *species*.

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Definition.—Mixtures of coarsely comminuted or bruised drugs, consisting usually of the softer parts of plants and intended to be used in making poultices, baths, and infusions (teas).

Method of Preparation.—The drugs are either cut, coarsely powdered, or bruised, and intimately mixed.

Advantage of Class.—They furnish combinations convenient for the preparation of medicines.

Preservation.—Keep in cartons and protect from insects.

Administration.—They may, according to character, be used as poultices or administered as infusions or extracted by maceration in spirituous liquors and used as "bitters."

SPIRITUS—SPIRITS

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The herb is macerated in order to impart the characteristic color to the preparation in deference to the wishes of the users, who demand a preparation having the characteristic color of the drug. This is doubtless due to the well-established but erroneous idea that the strength of a preparation is proportional to its color.

Advantage of Class.—They are stronger than the waters and are not only useful in flavoring, but may be used as medicaments.

Incompatibilities.—As a rule aqueous liquids cause a precipitation of the oil. The alcohol may also precipitate inorganic salts from aqueous solutions.

Preservation.—They should be kept in well-closed bottles in a cool place, protected from the light.

Administration.—They are too strongly alcoholic to be administered without dilution. They may be administered in water, sweetened water, or may be dropped on lump sugar.

Note.—The Pharmacopœial spirits are, as a rule, stronger than the spirits, essences, and extracts used for flavoring foods. These latter generally contain only enough alcohol to hold the flavoring principles in solution, and when labeled so as to clearly indicate that they are to be used to flavor foods the strength may be as follows:

Almond Extract, Oil of Almond free from hydrocyanic acid	1 m/m.
Anise Extract, Oil of Anise	3 m/m.
Cinnamon Extract, Oil of Cinnamon	3 m/m.
Peppermint Extract, Oil of Peppermint	3 m/m.
Spearmint Extract, Oil of Spearmint	3 m/m.
Wintergreen Extract, Oil of Wintergreen	3 m/m.

SPIRITUS ÆTHERIS—Spirit of Ether—Sp. Æth.—*Hoffmann's Drops*

Prepared by dissolving 32.5 mils ether in enough alcohol to make 100 mils.

Anodyne. Dose, 4 mils.

SPIRITUS ÆTHERIS NITROSI—Spirit of Nitrous Ether—Sp. Æth. Nitros.—*Sweet Spirit of Nitre*

An alcoholic solution of ethyl nitrite ($C_2H_5NO_2 = 75.05$) containing 3.5 to 4.5 per cent. of $C_2H_5NO_2$.

Preserve in small, well-stoppered, dark amber-colored bottles, in a cool place, protected from light and remote f om fire.

Occurs as a clear, mobile, volatile, inflammable, pale yellow or faintly greenish-yellow liquid, sp. gv. about 0.823, having a fragrant, ethereal, and pungent odor, free from acridity; a sharp burning taste, and a neutral reaction to litmus.

Prepared by dissolving 1 part by weight of freshly prepared ethyl nitrite in enough alcohol to make the total weight of the solution twenty-two times that of the ethyl nitrite used.

The ethyl nitrite is prepared by chemical reaction between a solution of sodium nitrite and a hydro-alcoholic solution of sulphuric acid, in an ice-water bath; separated from the solution with a separatory funnel, washed with alkaline water, dehydrated with anhydrous potassium carbonate, and immediately diluted with the required amount of alcohol.

Chemical Reaction:

$$H_2SO_4 + NaNO_2 = HNO_2 + NaHSO_4$$
$$C_2H_5OH + HNO_2 = C_2H_5NO_2 + H_2O$$

An ingredient in compound mixture of glycyrr

Diaphoretic, diuretic, antispasmodic. Dose, 2

SPIRITUS AMMONIÆ AROMATICUS—Aromatic Spirit of Ammonia—**Sp. Ammon. Arom.**

Preserve in glass-stoppered bottles in a cool place.

Occurs as a nearly colorless liquid when freshly prepared, but gradually acquiring a yellow color; sp. gv. about 0.900, and having the pungent odor and taste of ammonia.

Prepared by dissolving 3.4 gm. ammonium carbonate, in translucent pieces, in a solution of 9 mils ammonia-water and 14 mils distilled water and allowing it to stand for twelve hours; then gradually adding this solution to a solution of 1 mil oil of lemon and 0.1 mil, each, oil of lavender and oil of myristica in 70 mils alcohol; following with enough distilled water to make 100 mils, and filtering after twenty-four hours through paper in a well-covered funnel.

Chemical reaction occurs in this process. The purpose of the ammonia-water is to change the ammonium bicarbonate in the ammonium carbonate, which is insoluble in alcohol, to normal carbonate, which is soluble in alcohol.

Chemical Reaction:

$$NH_4HCO_3.NH_4NH_2CO_2 + NH_4OH = 2(NH_4)_2CO_3$$

Used as menstruum in preparing ammoniated tincture of guaiac and ammoniated tincture of valerian.

Stimulant, antacid, more agreeable to the taste than most other preparations of ammonia. Dose, 2 mils.

SPIRITUS AMYGDALÆ AMARÆ—Spirit of Bitter Almond—**Sp. Amygd. Amar.**

Intended for medicinal use; must not be used for flavoring foods, as it contains a small amount of hydrocyanic acid. Spirit of bitter almond for flavoring foods (Essence of Bitter Almond) must not contain hydrocyanic acid.

Prepared by dissolving 1 mil oil of bitter almond in 80 mils alcohol and diluting to 100 mils with distilled water.

Flavoring agent for medicinal use. Dose, 0.5 mil.

SPIRITUS ANISI—Spirit of Anise—**Sp. Anisi**

Prepared by dissolving 10 mils oil of anise in sufficient alcohol to make 100 mils.

Carminative, flavoring. Dose, 2 mils.

SPIRITUS AURANTII COMPOSITUS—Compound Spirit of Orange—Sp. Aur. Co.

Prepared by dissolving 20 mils oil of orange, 5 mils oil of lemon, 2 mils oil of coriander, and 0.5 mil oil of anise in sufficient alcohol to make 100 mils.

An ingredient in aromatic elixir, 1.2 m/m.

Adjuvant. Used in combination with other drugs.

SPIRITUS CAMPHORÆ—Spirit of Camphor—Sp. Camph.

Contains 9.5 to 10.5 g/m camphor.

Prepared by dissolving 10 gm. camphor in sufficient alcohol to make 100 mils.

Antiseptic, counterirritant, anodyne. Dose, 1 mil.

SPIRITUS CHLOROFORMI — Spirit of Chloroform — Sp. Chlorof.

Prepared by dissolving 6 mils chloroform in sufficient alcohol to make 100 mils.

Intestinal antispasmodic. Dose, 2 mils.

SPIRITUS CINNAMOMI—Spirit of Cinnamon—Sp. Cinnam.

Prepared by dissolving 10 mils oil of cinnamon in sufficient alcohol to make 100 mils.

An ingredient in syrup of rhubarb, 0.4 m/m.

Carminative, flavoring. Dose, 2 mils.

SPIRITUS GLYCERYLIS NITRATIS—Spirit of Glyceryl Trinitrate—Sp. Glyceryl. Nit.—*Spirit of Glonoin; Spirit of Nitroglycerin*

Contains 1 to 1.1 per cent. of $C_3H_5(NO_3)_3$ (227.07).

Preserve in well-stoppered bottles in a cool, dark place, remote from fire.

A clear, colorless liquid, sp. gv. 0.814 to 0.820, having the odor of alcohol and a neutral reaction to litmus. Great caution must be exercised in tasting it, since even a small quantity is liable to produce a violent headache. The same effect is produced when it is freely applied to the skin.

Great care must be exercised in dispensing, handling, packing, transporting, and storing this spirit, since a dangerous explosion may result if any considerable quantity of it is spilled, and the alcohol wholly or partially lost by evaporation. If through accident it is spilled, a solution of potassium hydroxide must be poured over it at once to effect partial decomposition.

Vasodilator, motor depressant, cardiac stimulant. Dose, 0.05 mil.

SPIRITUS JUNIPERI—Spirit of Juniper—**Sp. Junip.**

Prepared by dissolving 5 mils oil of juniper in sufficient alcohol to make 100 mils.

Diuretic. Dose, 2 mils.

SPIRITUS JUNIPERI COMPOSITUS—Compound Spirit of Juniper—**Sp. Junip. Co.**

Prepared by dissolving 0.4 mil oil of juniper, 0.05 mil each oil of caraway and oil of fennel in 70 mils alcohol, and diluting with sufficient distilled water, gradually added, to make 100 mils. This preparation corresponds very closely to Holland gin.

Diuretic. Dose, 10 mils.

SPIRITUS LAVANDULÆ—Spirit of Lavender—**Sp. Lavand.**

Prepared by dissolving 5 mils oil of lavender in sufficient alcohol to make 100 mils.

Stimulant, carminative. Dose, 2 mils.

SPIRITUS MENTHÆ PIPERITÆ—Spirit of Peppermint—**Sp. Menth. Pip.**—*Essence of Peppermint*

Preserve in amber-colored bottles.

Prepared by adding 1 gm. specially prepared peppermint to 10 mils oil of peppermint and enough alcohol to make 100 mils, macerating six hours, occasionally agitating, and then filtering.

The peppermint is prepared by macerating 1 gm. of pepper- [illegible] stems, in 50 mils water for one hour, and [illegible] em.

[illegible] oring agent. Dose, 2 mils.

SPIRITUS MENTHÆ VIRIDIS—Spirit of **Spearmint—Sp. Menth. Vir.**

Preserve in amber-colored bottles.

Prepared by adding 1 gm. specially prepared spearmint to 10 mils oil of spearmint and enough alcohol to make 100 mils, macerating six hours, occasionally agitating, and then filtering.

The spearmint is prepared by macerating 1 gm. spearmint leaves, free from stems, in 50 mils water for one hour and then strongly expressing them.

Carminative, stomachic. Dose, 2 mils.

STILI, N. F.—PENCILS

Origin.—L. *stilus*, a pointed instrument.

N. F., 2.

Definition.—There are two classes of medicinal pencils: Hard Soluble Pencils (Stili Dilubiles, N. F., Paste Pencils), and Salve Pencils (Stili Unguentes). Pencils are cylindric (pencil) shaped medicinal substances suitable for direct application to the skin or wound.

Method of Preparation.—Hard soluble pencils are prepared by massing the medicinal substances with a paste consisting of starch, dextrin, tragacanth, and sugar with sufficient water, and rolling into cylinders about 5 mm. in diameter and about 5 cm. long, drying, and wrapping in tin-foil.

Salve pencils are mixtures of waxes, oils, resins, etc., with medicinal agents molded into stick form, as, for example, camphor ice.

SUCCI, N. F.—JUICES

Origin.—L. *succus*, juice.

N. F., 3.

Definition.—A class of liquid medicinal agents consisting e[illegible]tirely or in part of the expressed juice of fresh drugs.

Method of Preparation.—Expression.

Preservation.—Best when freshly prepared, but preserved by the addition of alcohol or by steriliza

SUPPOSITORIA—SUPPOSITORIES

Origin.—L. *suppositorium*, that is placed underneath.

Pharmacopœial, 1; U. S. P. VIII, 1; N. F., 1.

Definition.—Suppositories are solid bodies of various weight and shapes, adapted for introduction into the different orifices of the human body, and melting readily at body heat.

Methods of Preparation.—I. Chemical reaction, fusing and molding: Suppositoria Glycerini. II. Incorporating, fusing, and molding. III. Incorporating, and pressing. IV. Incorporating and rolling (shaping by hand).

The vehicles usually employed are oil of theobroma, glycerinated gelatin, and sodium stearate.

For suppositories made with oil of theobroma the Pharmacopœia directs that the following general process may be employed:

"Take of

The medicinal substance, the prescribed quantity.
Oil of Theobroma, grated, a sufficient quantity.

"Reduce the medicinal substance, if dry, to a very fine powder, or, if an extract, soften it with an appropriate liquid, then mix it thoroughly in a mortar with about an equal weight of grated oil of theobroma, and incorporate the remainder of the oil of theobroma until a homogeneous, plastic mass is obtained, adding, if necessary, a small quantity of expressed oil of almond. Roll the mass on a graduated tile until a cylinder of the proper length is formed, divide this into the required number of equal parts, and with a spatula or other mechanical aid form them into the desired shape."

Note.—It is recommended to transfer the mass to a piece of bleached muslin, and, with the fingers thus separated from direct contact with the mass, shape it into as perfect a cylinder as possible; then transfer it to the pill tile and finish the rolling with the spatula or "pill roller." After the cylinder is cut the segments may again be transferred to the muslin and roughly shaped, the final finishing being done with a spatula on the

ion is preferred, mix the
with about an equal

weight of grated oil of theobroma, as above directed; then thoroughly incorporate it with the remainder of the oil of theobroma, previously finely grated, chilling the mortar, if necessary, to preserve the pulverulent form of the mixture. Transfer the powdered mass to the cylinder of an appropriate suppository compressor, and by the use of this apparatus prepare the desired number of compressed suppositories.

"If the process of fusion is preferred, mix the medicinal substance with about an equal weight of grated oil of theobroma, as above directed, then thoroughly incorporate it with the remainder of the oil of theobroma, previously melted by a gentle heat, in a suitable vessel provided with a lip; then allow it to cool to about 30° C., and, when the mixture begins to congeal, pour it immediately into suitable well-cooled molds. Keep the molds at a freezing temperature until the suppositories have hardened and are ready to be removed.

"For suppositories containing hydrated chloral, phenol, or other substances which soften the vehicle, raise the melting-point of the oil of theobroma by the addition of from 10 to 15 per cent. of spermaceti, but the melting-point must not be raised above 37° C."

For suppositories made with glycerinated gelatin the following process may be used:

"Take of

The medicinal substance, the prescribed quantity,
Glycerinated Gelatin,
Glycerin,
Water, each, a sufficient quantity.

"Mix the medicinal substance, if solid and soluble in water or glycerin, or if a miscible liquid, with a little water, and add sufficient glycerin to make the weight of the mixture one-half that of the finished mass. Then thoroughly incorporate it with an equal weight of melted glycerinated gelatin, and pour it at once into suitable molds which have been greased with a small quantity of petrolatum. Cool the molds thoroughly before removing the suppositories. Molds for uretheral suppositories should be warmed sufficiently before pouring the mass to facilitate the proper filling of the mold. Suppositories having a firmer consistence may be prepared by substituting mucilage of acacia for a portion of the water or glycerin.

"If the medicinal substance is insoluble in water or glycerin, thoroughly levigate it in a warm mortar with a sufficient quantity of glycerin to make the weight of the mixture one-half that of the finished mass. Then thoroughly incorporate it with an equal weight of melted glycerinated gelatin, and pour it into suitable molds as above directed. With bulky powders about one-half of the glycerin may be replaced with water before levigation.

"Glycerinated gelatin suppositories should be protected against the effects of heat, moisture, and dry air by keeping them in tightly closed containers in a cool place."

Rectal suppositories should be cone shaped, and when made from oil of theobroma should weigh about 2 gm.

Urethral suppositories (bougies) should be pencil shaped, pointed at one extremity, and either 7 cm. in length, weighing about 2 gm., or 14 cm. in length, weighing about 4 gm., when made with glycerinated gelatin. If prepared with oil of theobroma they should weigh about one-half the above quantities.

Vaginal suppositories should be globular or oviform in shape, and weigh about 10 gm. if made with glycerinated gelatin, and about 4 gm. if made with oil of theobroma.

Advantage of Class.—They furnish medicaments in convenient form for the prolonged treatment of the mucous membranes lining the various orifices of the human body.

Incompatibilities.—They may be said to have none, as they are always administered alone. However, as a rule, astringent drugs or those containing principles that precipitate gelatin should not be compounded with the glycerogelatin vehicle.

Preservation.—It is best that they be freshly prepared. Their low melting-point makes it necessary that they be kept at a temperature below that of the human body (37° C.). They are best preserved in a cool, dry refrigerator. Suppositories compounded with a glycerogelatin vehicle must be protected from the moisture of the air.

Administration.—They are administered by contact, that is, inserted into an orifice of the body and allowed to remain as long as may be necessary.

the salts are then separated by dialysis. After dialysis is complete sufficient sodium chloride is added to make a 0.6 to 0.9 per cent. solution of the salt.

Antitetanic. Curative dose, 10,000 units; protective, 1500 units.

SERUM ANTITETANICUM SICCUM (IX)—Dried Antitetanic Serum—**Ser. Antitetan. Sicc.**—*Dried Tetanus Antitoxin*

It must comply with the requirements for control, labeling, and potency expressed for serums. It has a potency of not less than 1000 units per gm.

Dried antitetanic serum if kept as directed does not lose its potency as does the liquid serum.

Preserve in hermetically sealed, amber-colored glass containers, free from air, at a temperature between 4.5° and 15° C., in a dark place.

Occurs either in the form of orange or yellowish flakes or small lumps, or as a yellowish-white powder, without odor.

Soluble in 9 parts of water, the solution being opalescent and slightly viscous.

Obtained by evaporating either antitetanic serum or purified antitetanic serum in a vacuum over sulphuric acid or by passing over it a current of warm air freed from bacteria.

Prepared for use by dissolving in recently boiled and cooled distilled water, preferably in the original container, and under the most rigid aseptic conditions.

Antitetanic. Sometimes used as a dusting-powder or for local application to infected wounds. Curative dose, 10,000 units; protective, 1500 units.

SPECIES, N. F.—SPECIES (TEAS)

Origin.—L. *species.*

N. F., 3.

Definition.—Mixtures of coarsely comminuted or bruised drugs, consisting usually of the softer parts of plants and intended to be used in making poultices, baths, and infusions (teas).

Method of Preparation.—The drugs are either cut, coarsely powdered, or bruised, and intimately mixed.

Advantage of Class.—They furnish combinations convenient for the preparation of medicines.

Preservation.—Keep in cartons and protect from insects.

Administration.—They may, according to character, be used as poultices or administered as infusions or extracted by maceration in spirituous liquors and used as "bitters."

SPIRITUS—SPIRITS

Origin.—L. *spiritus*, the breath of life.

Pharmacopœial, 15; U. S. P. VIII, 25; N. F., 9.

Definition.—Spirits are alcoholic solutions of volatile substances, usually volatile oils.

Methods of Preparation.—They are prepared by: I. Simple solution. II. Simple solution, including chemical reaction: Spiritus Ætheris Nitrosi and Spiritus Ammoniæ Aromaticus. III. Simple solution, including maceration: Spiritus Menthæ Piperitæ and Spiritus Menthæ Viridis.

The herb is macerated in order to impart the characteristic color to the preparation in deference to the wishes of the users, who demand a preparation having the characteristic color of the drug. This is doubtless due to the well-established but erroneous idea that the strength of a preparation is proportional to its color.

Advantage of Class.—They are stronger than the waters and are not only useful in flavoring, but may be used as medicaments.

Incompatibilities.—As a rule aqueous liquids cause a precipitation of the oil. The alcohol may also precipitate inorganic salts from aqueous solutions.

Preservation.—They should be kept in well-closed bottles in a cool place, protected from the light.

Administration.—They are too strongly alcoholic to be administered without dilution. They may be administered in water, sweetened water, or may be dropped on lump sugar.

Note.—The Pharmacopœial spirits are, as a rule, stronger than the spirits, essences, and extracts used for flavoring foods. These latter generally contain only enough alcohol to hold the flavoring principles in solution, and when labeled so as to clearly

The flavoring adjuvants are:

Syrupus Picis Liquidæ.
Syrupus Pruni Virginianæ.
Syrupus Sarsaparillæ Compositus.
Syrupus Tolutanus.
Syrupus Zingiberis.

Character of Syrups

Syrups that are Acid in Reaction

Syrupus Acidi Citrici, 1 g/m.
Syrupus Acidi Hydriodici, HI, 1.4 g/m.
Syrupus Aurantii, citric acid, 0.5 g/m.
Syrupus Calcii Lactophosphatis.
Syrupus Ferri Iodidi, dil. hypophos. acid, 2 m/g.
Syrupus Hypophosphitum, dil. hypophos. acid, 0.2 m/m.
Syrupus Ipecacuanhæ, acetic acid, 1 m/m.
Syrupus Lactucarii, citric acid, 0.1 g/m.
Syrupus Scillæ, vinegar of squill, 45 m/m.

Syrups that are Alkaline in Reaction

Syrupus Rhei, potassium carbonate, 1 g/m.
Syrupus Rhei Aromaticus, potassium carbonate, 0.1 g/m.
Syrupus Senegæ, trace of ammonia-water, from the fldext. senega.

Syrups Containing Alcohol

Syrupus Acidi Citrici, tr. of lemon peel, 1 m/m.
Syrupus Aurantii, alcohol, 5 m/m.
Syrupus Aurantii, tr. of sweet orange peel, 5 m/m.
Syrupus Ipecacuanhæ, fldext. ipecac, 7 m/m.
Syrupus Lactucarii, tr. lactucarium, 10 m/m.
Syrupus Picis Liquidæ, alcohol, 5 m/m.
Syrupus Rhei, fldext. rhubarb, 10 m/m.
Syrupus Rhei Aromaticus, arom. tr. rhubarb, 15 m/m.
Syrupus Sarsaparillæ Compositus,
  fldext. glycyrrhiza, 1.5 m/m.
  fldext. sarsaparilla, 20 m/m.
  fldext. senna, 1.5 m/m.
  alcohol, 1.94 m/m.
Syrupus Scillæ Compositus,
  fldext. senega, 8 m/m.
  fldext. squill, 8 m/m

Syrupus Senegæ, fldext. senega, 20 m/m.
Syrupus Sennæ, fldext. senna, 25 m/m.
Syrupus Tolutanus, tr. tolu, 5 m/m.
Syrupus Zingiberis, $\begin{cases}\text{fldext. ginger, 3 m/m.}\\ \text{alcohol, 2 m/m.}\end{cases}$

Syrups Containing Glycerin

Syrupus Calcii Lactophosphatis, 5 m/m.
Syrupus Hypophosphitum, 5 m/m.
Syrupus Ipecacuanhæ, 10 m/m.
Syrupus Lactucarii, 20 m/m.; tr. lactucarium, 10 m/m.
Syrupus Pruni Virginianæ, 5 m/m.

Syrups in which Chemical Reaction Occurs

Syrupus Calcii Lactophosphatis.
Chemical Reaction:

$$CaCO_3 + 2H.CH\ CHOH.COO = Ca(CH_3CHOH.COO)_2 + CO_2 + H_2O$$

Syrupus Ferri Iodidi.
Chemical Reaction:

$$Fe + I_2 = FeI_2$$

SYRUPUS—Syrup—**Syr.**—*Sirup; Simple Syrup*

It should be free from molds and is best when freshly prepared.

A clear, colorless, or only slightly yellowish liquid; sp. gv. about 1.313; odorless and having a sweet, characteristic taste.

Prepared by percolating 85 gm. sugar with sufficient distilled water to make 100 mils, see page 403.

Also prepared by the hot process, which consists in dissolving 85 gm. sugar with the aid of heat in 45 mils distilled water, raising the temperature to the boiling-point, straining the liquid, and passing enough distilled water through the strainer to make, when cold, 100 mils.

It may be conveniently prepared in small quantities by placing 850 gm. sugar in a tared bottle, adding 458 gm. hot distilled water, to make 1308 gm., agitating occasionally until solution is effected, and straining or filtering if necessary.

SPIRITUS AURANTII COMPOSITUS—Compound Spirit of Orange—**Sp. Aur. Co.**

Prepared by dissolving 20 mils oil of orange, 5 mils oil of lemon, 2 mils oil of coriander, and 0.5 mil oil of anise in sufficient alcohol to make 100 mils.

An ingredient in aromatic elixir, 1.2 m/m.

Adjuvant. Used in combination with other drugs.

SPIRITUS CAMPHORÆ—Spirit of Camphor—**Sp. Camph.**

Contains 9.5 to 10.5 g/m camphor.

Prepared by dissolving 10 gm. camphor in sufficient alcohol to make 100 mils.

Antiseptic, counterirritant, anodyne. Dose, 1 mil.

SPIRITUS CHLOROFORMI — Spirit of Chloroform — **Sp. Chlorof.**

Prepared by dissolving 6 mils chloroform in sufficient alcohol to make 100 mils.

Intestinal antispasmodic. Dose, 2 mils.

SPIRITUS CINNAMOMI—Spirit of Cinnamon—**Sp. Cinnam.**

Prepared by dissolving 10 mils oil of cinnamon in sufficient alcohol to make 100 mils.

An ingredient in syrup of rhubarb, 0.4 m/m.

Carminative, flavoring. Dose, 2 mils.

SPIRITUS GLYCERYLIS NITRATIS—Spirit of Glyceryl Trinitrate—**Sp. Glyceryl. Nit.**—*Spirit of Glonoin; Spirit of Nitroglycerin*

Contains 1 to 1.1 per cent. of $C_3H_5(NO_3)_3$ (227.07).

Preserve in well-stoppered bottles in a cool, dark place, remote from fire.

A clear, colorless liquid, sp. gv. 0.814 to 0.820, having the odor of alcohol and a neutral reaction to litmus. Great caution must be exercised in tasting it, since even a small quantity is liable to produce a violent headache. The same effect is produced when it is freely applied to the skin.

Great care must be exercised in dispensing, handling, packing, transporting, and storing this spirit, since a dangerous explosion may result if any considerable quantity of it is spilled, and the alcohol wholly or partially lost by evaporation. If through accident it is spilled, a solution of potassium hydroxide must be poured over it at once to effect partial decomposition.

Vasodilator, motor depressant, cardiac stimulant. Dose, 0.05 mil.

SPIRITUS JUNIPERI—Spirit of Juniper—**Sp. Junip.**

Prepared by dissolving 5 mils oil of juniper in sufficient alcohol to make 100 mils.

Diuretic. Dose, 2 mils.

SPIRITUS JUNIPERI COMPOSITUS—Compound Spirit of Juniper—**Sp. Junip. Co.**

Prepared by dissolving 0.4 mil oil of juniper, 0.05 mil each oil of caraway and oil of fennel in 70 mils alcohol, and diluting with sufficient distilled water, gradually added, to make 100 mils. This preparation corresponds very closely to Holland gin.

Diuretic. Dose, 10 mils.

SPIRITUS LAVANDULÆ—Spirit of Lavender—**Sp. Lavand.**

Prepared by dissolving 5 mils oil of lavender in sufficient alcohol to make 100 mils.

Stimulant, carminative. Dose, 2 mils.

SPIRITUS MENTHÆ PIPERITÆ—Spirit of Peppermint—**Sp. Menth. Pip.**—*Essence of Peppermint*

Preserve in amber-colored bottles.

Prepared by adding 1 gm. specially prepared peppermint to 10 mils oil of peppermint and enough alcohol to make 100 mils, macerating six hours, occasionally agitating, and then filtering.

The peppermint is prepared by macerating 1 gm. of peppermint leaves, free from stems, in 50 mils water for one hour, and then strongly expressing them.

Stomachic, carminative, flavoring agent. Dose, 2 mils.

SPIRITUS MENTHÆ VIRIDIS—Spirit of Spearmint—Sp. Menth. Vir.

Preserve in amber-colored bottles.

Prepared by adding 1 gm. specially prepared spearmint to 10 mils oil of spearmint and enough alcohol to make 100 mils, macerating six hours, occasionally agitating, and then filtering.

The spearmint is prepared by macerating 1 gm. spearmint leaves, free from stems, in 50 mils water for one hour and then strongly expressing them.

Carminative, stomachic. Dose, 2 mils.

STILI, N. F.—PENCILS

Origin.—L. *stilus*, a pointed instrument.

N. F., 2.

Definition.—There are two classes of medicinal pencils: Hard Soluble Pencils (Stili Dilubiles, N. F., Paste Pencils), and Salve Pencils (Stili Unguentes). Pencils are cylindric (pencil) shaped medicinal substances suitable for direct application to the skin or wound.

Method of Preparation.—Hard soluble pencils are prepared by massing the medicinal substances with a paste consisting of starch, dextrin, tragacanth, and sugar with sufficient water, and rolling into cylinders about 5 mm. in diameter and about 5 cm. long, drying, and wrapping in tin-foil.

Salve pencils are mixtures of waxes, oils, resins, etc., with medicinal agents molded into stick form, as, for example, camphor ice.

SUCCI, N. F.—JUICES

Origin.—L. *succus*, juice.

N. F., 3.

Definition.—A class of liquid medicinal agents consisting [illegible] tirely or in part of the expressed juice of fresh drugs.

Method of Preparation.—Expression.

Preservation.—Best when freshly prepared, but

preserved by the addition of alcohol or by steriliza

SUPPOSITORIA—SUPPOSITORIES

Origin.—L. *suppositorium*, that is placed underneath.

Pharmacopœial, 1; U. S. P. VIII, 1; N. F., 1.

Definition.—Suppositories are solid bodies of various weight and shapes, adapted for introduction into the different orifices of the human body, and melting readily at body heat.

Methods of Preparation.—I. Chemical reaction, fusing and molding: Suppositoria Glycerini. II. Incorporating, fusing, and molding. III. Incorporating, and pressing. IV. Incorporating and rolling (shaping by hand).

The vehicles usually employed are oil of theobroma, glycerinated gelatin, and sodium stearate.

For suppositories made with oil of theobroma the Pharmacopœia directs that the following general process may be employed:

"Take of

The medicinal substance, the prescribed quantity.
Oil of Theobroma, grated, a sufficient quantity.

"Reduce the medicinal substance, if dry, to a very fine powder, or, if an extract, soften it with an appropriate liquid, then mix it thoroughly in a mortar with about an equal weight of grated oil of theobroma, and incorporate the remainder of the oil of theobroma until a homogeneous, plastic mass is obtained, adding, if necessary, a small quantity of expressed oil of almond. Roll the mass on a graduated tile until a cylinder of the proper length is formed, divide this into the required number of equal parts, and with a spatula or other mechanical aid form them into the desired shape."

Note.—It is recommended to transfer the mass to a piece of bleached muslin, and, with the fingers thus separated from direct contact with the mass, shape it into as perfect a cylinder as possible; then transfer it to the pill tile and finish the rolling with the spatula or "pill roller." After the cylinder is cut the segments may again be transferred to the muslin and roughly shaped, the final finishing being done with a spatula on the pill tile.

"If the process of cold compression is preferred, mix the medicinal substance in a suitable mortar with about an equal weight of grated oil of theobroma, as above directed; then thoroughly incorporate it with the remainder of the oil of theobroma, previously finely grated, chilling the mortar, if necessary, to preserve the pulverulent form of the mixture. Transfer the powdered mass to the cylinder of an appropriate suppository compressor, and by the use of this apparatus prepare the desired number of compressed suppositories.

"If the process of fusion is preferred, mix the medicinal substance with about an equal weight of grated oil of theobroma, as above directed, then thoroughly incorporate it with the remainder of the oil of theobroma, previously melted by a gentle heat, in a suitable vessel provided with a lip; then allow it to cool to about 30° C., and, when the mixture begins to congeal, pour it immediately into suitable well-cooled molds. Keep the molds at a freezing temperature until the suppositories have hardened and are ready to be removed.

"For suppositories containing hydrated chloral, phenol, or other substances which soften the vehicle, raise the melting-point of the oil of theobroma by the addition of from 10 to 15 per cent. of spermaceti, but the melting-point must not be raised above 37° C."

For suppositories made with glycerinated gelatin the following process may be used:

"Take of

The medicinal substance, the prescribed quantity,
Glycerinated Gelatin,
Glycerin,
Water, each, a sufficient quantity.

"Mix the medicinal substance, if solid and soluble in water or glycerin, or if a miscible liquid, with a little water, and add sufficient glycerin to make the weight of the mixture one-half that of the finished mass. Then thoroughly incorporate it with an equal weight of melted glycerinated gelatin, and pour it at once into suitable molds which have been greased with a small quantity of petrolatum. Cool the molds thoroughly before removing the suppositories. Molds for uretheral suppositories should be warmed sufficiently before pouring the mass to facilitate the proper filling of the mold. Suppositories having firmer consistence may be prepared by substituting mucilage of acacia for a portion of the water or glycerin.

"If the medicinal substance is insoluble in water or glycerin, thoroughly levigate it in a warm mortar with a sufficient quantity of glycerin to make the weight of the mixture one-half that of the finished mass. Then thoroughly incorporate it with an equal weight of melted glycerinated gelatin, and pour it into suitable molds as above directed. With bulky powders about one-half of the glycerin may be replaced with water before levigation.

"Glycerinated gelatin suppositories should be protected against the effects of heat, moisture, and dry air by keeping them in tightly closed containers in a cool place."

Rectal suppositories should be cone shaped, and when made from oil of theobroma should weigh about 2 gm.

Urethral suppositories (bougies) should be pencil shaped, pointed at one extremity, and either 7 cm. in length, weighing about 2 gm., or 14 cm. in length, weighing about 4 gm., when made with glycerinated gelatin. If prepared with oil of theobroma they should weigh about one-half the above quantities.

Vaginal suppositories should be globular or oviform in shape, and weigh about 10 gm. if made with glycerinated gelatin, and about 4 gm. if made with oil of theobroma.

Advantage of Class.—They furnish medicaments in convenient form for the prolonged treatment of the mucous membranes lining the various orifices of the human body.

Incompatibilities.—They may be said to have none, as they are always administered alone. However, as a rule, astringent drugs or those containing principles that precipitate gelatin should not be compounded with the glycerogelatin vehicle.

Preservation.—It is best that they be freshly prepared. Their low melting-point makes it necessary that they be kept at a temperature below that of the human body (37° C.). They are best preserved in a cool, dry refrigerator. Suppositories compounded with a glycerogelatin vehicle must be protected from the moisture of the air.

Administration.—They are administered by contact, that is, inserted into an orifice of the body and allowed to remain as long as may be necessary.

SUPPOSITORIA GLYCERINI—Suppositories of Glycerin—**Supp. Glycerin.**

Preserve in tightly stoppered glass vessels in a cool place.

They are prepared by dissolving 5 gm. monohydrated sodium carbonate in 50 mils of water and adding the solution to 300 gm. glycerin, contained in a suitable container, placed in a water-bath in such a way that the vessel is well down in the boiling water, and its contents protected as much as possible from the steam of the bath; adding 20 gm. stearic acid and heating the mixture for fifteen minutes or until the carbon dioxide ceases to be evolved and the liquid is clear; then pouring the melted mass into suitable molds, removing the suppositories when they have completely cooled. This makes 100 suppositories (ten times the amount in U. S. P. Formula).

Rectal evacuant. Should not be habitually employed owing to their irritating effect upon the mucous membrane.

SYRUPI—SYRUPS

Origin.—Arab. from *shurab*, a beverage.

Pharmacopœial, 22; U. S. P. VIII, 29; N. F., 44.

Definition.—Syrups are concentrated, aqueous solutions of sugar, with or without medication.

Methods of Preparation.—They are prepared by three methods, as follows:

I. By dissolving the sugar in the liquid by the aid of heat. Applicable when the constituents are not affected by an increase in temperature and when nearly saturated solutions of sugar are desired, with a minimum expenditure of time:

Syrupus.
Syrupus Acaciæ.
Syrupus Ferri Iodidi.
Syrupus Scillæ.
Syrupus Tolutanus.
Syrupus Zingiberis.

II. By dissolving the sugar by agitation in the cold liquid. Applicable when the constituents are affected more or less by heat:

Syrupus Aurantii.
Syrupus Aurantii Florum.
Syrupus Calcii Lactophosphatis.
Syrupus Hypophosphitum.
Syrupus Ipecacuanhæ.
Syrupus Picis Liquidæ.
Syrupus Pruni Virginianæ.

III. By mixing the medicated liquid with syrup. Applicable when the medicament is readily soluble in syrup, and will not reduce the saccharine content of the finished preparation to an undesirable degree:

Syrupus Acidi Citrici.
Syrupus Acidi Hydriodici.
Syrupus Lactucarii.
Syrupus Rhei.
Syrupus Rhei Aromaticus.
Syrupus Sarsaparillæ Compositus.
Syrupus Scillæ Compositus.
Syrupus Senegæ.
Syrupus Sennæ.

Alternate Method.—The Pharmacopœia directs that the following syrups may be prepared, if desired, by percolation:

Syrupus.
Syrupus Aurantii Florum.
Syrupus Ipecacuanhæ.
Syrupus Picis Liquidæ.
Syrupus Pruni Virginianæ.
Syrupus Tolutanus.
Syrupus Zingiberis.

The outline of the method is as follows:

Place at the bottom of a glass percolator of suitable size a layer of purified cotton about $\frac{1}{2}$ inch in thickness, well fitted to the sides of the percolator, and moisten it with a little distilled water. Introduce the sugar into the percolator, make its surface level without shaking or jarring, then carefully pour upon it the prepared liquid and regulate the flow of the percolate, if necessary, so that it passes out in rapid drops. Return the first portion of the percolate until it runs through clear, and when all the liquid has passed, follow it by distilled water, added in portions so that all of the sugar may be dissolved and the product measure the required volume. Mix thoroughly.

Advantage of Class.—They are pleasant to take.

Incompatibilities.—They have the incompatibilities of aqueous liquids and, in addition, those of their other constituents.

Preservation.—They should be kept in well-filled, closely stoppered bottles, in a cool place (about 60° C.), having a temperature as nearly uniform as possible.

Administration.—They are administered largely as adjuvants and flavoring agents, though sometimes prescribed alone.

The flavoring syrups are:

Syrupus.
Syrupus Acidi Citrici.
Syrupus Aurantii.
Syrupus Aurantii Florum.

The flavoring adjuvants are:

Syrupus Picis Liquidæ.
Syrupus Pruni Virginianæ.
Syrupus Sarsaparillæ Compositus.
Syrupus Tolutanus.
Syrupus Zingiberis.

Character of Syrups

Syrups that are Acid in Reaction

Syrupus Acidi Citrici, 1 g/m.
Syrupus Acidi Hydriodici, HI, 1.4 g/m.
Syrupus Aurantii, citric acid, 0.5 g/m.
Syrupus Calcii Lactophosphatis.
Syrupus Ferri Iodidi, dil. hypophos. acid, 2 m/g.
Syrupus Hypophosphitum, dil. hypophos. acid, 0.2 m/m.
Syrupus Ipecacuanhæ, acetic acid, 1 m/m.
Syrupus Lactucarii, citric acid, 0.1 g/m.
Syrupus Scillæ, vinegar of squill, 45 m/m.

Syrups that are Alkaline in Reaction

Syrupus Rhei, potassium carbonate, 1 g/m.
Syrupus Rhei Aromaticus, potassium carbonate, 0.1 g/m.
Syrupus Senegæ, trace of ammonia-water, from the fldext. senega.

Syrups Containing Alcohol

Syrupus Acidi Citrici, tr. of lemon peel, 1 m/m.
Syrupus Aurantii, alcohol, 5 m/m.
Syrupus Aurantii, tr. of sweet orange peel, 5 m/m.
Syrupus Ipecacuanhæ, fldext. ipecac, 7 m/m.
Syrupus Lactucarii, tr. lactucarium, 10 m/m.
Syrupus Picis Liquidæ, alcohol, 5 m/m.
Syrupus Rhei, fldext. rhubarb, 10 m/m.
Syrupus Rhei Aromaticus, arom. tr. rhubarb, 15 m/m.
Syrupus Sarsaparillæ Compositus,
  fldext. glycyrrhiza, 1.5 m/m.
  fldext. sarsaparilla, 20 m/m.
  fldext. senna, 1.5 m/m.
  alcohol, 1.94 m/m.
Syrupus Scillæ Compositus,
  fldext. senega, 8
  fldext. squill.

Syrupus Senegæ, fldext. senega, 20 m/m.
Syrupus Sennæ, fldext. senna, 25 m/m.
Syrupus Tolutanus, tr. tolu, 5 m/m.
Syrupus Zingiberis, { fldext. ginger, 3 m/m. alcohol, 2 m/m.

Syrups Containing Glycerin

Syrupus Calcii Lactophosphatis, 5 m/m.
Syrupus Hypophosphitum, 5 m/m.
Syrupus Ipecacuanhæ, 10 m/m.
Syrupus Lactucarii, 20 m/m.; tr. lactucarium, 10 **m/m.**
Syrupus Pruni Virginianæ, 5 m/m.

Syrups in which Chemical Reaction Occurs

Syrupus Calcii Lactophosphatis.
Chemical Reaction:

$$CaCO_3 + 2H.CH\ CHOH.COO = Ca(CH_3CHOH.COO)_2 + CO_2 + H_2O$$

Syrupus Ferri Iodidi.
Chemical Reaction:

$$Fe + I_2 = FeI_2$$

SYRUPUS—Syrup—**Syr.**—*Sirup; Simple Syrup*

It should be free from molds and is best when freshly prepared.

A clear, colorless, or only slightly yellowish liquid; sp. gv. about 1.313; odorless and having a sweet, characteristic taste.

Prepared by percolating 85 gm. sugar with sufficient distilled water to make 100 mils, see page 403.

Also prepared by the hot process, which consists in dissolving 85 gm. sugar with the aid of heat in 45 mils distilled water, raising the temperature to the boiling-point, straining the liquid, and passing enough distilled water through the strainer to make, when cold, 100 mils.

It may be conveniently prepared in small quantities by placing 850 gm. sugar in a tared bottle, adding 458 gm. hot distilled water, to make 1308 gm., agitating occasionally until solution is effected, and straining or filtering if necessary.

An ingredient in aromatic elixir, 37.5 m/m; compound mixture of glycyrrhiza, 5 m/m; emulsion of cod liver oil, 10 m/m; emulsion of oil of turpentine, 25 m/m; solution of magnesium citrate, 60 mils, and other syrups, see page 403.

Used in preparing mass of ferrous carbonate, q. s.

Sweetening agent.

SYRUPUS ACACIÆ—Syrup of Acacia—**Syr. Acac.**

Prepared by dissolving 10 gm. selected acacia in 43 mils distilled water, adding 80 gm. sugar and heating to solution on a water-bath, maintaining the boiling temperature fifteen minutes; then straining the hot liquid, adding sufficient recently boiled distilled water to make 100 mils, transferring it while yet hot to small bottles which have previously been rinsed with boiling water and heated in an oven at 160° C. for from fifteen to thirty minutes, and then closing the bottles tightly with rubber stoppers which have been just previously boiled in water for thirty minutes, and capping them with paper.

Demulcent; also used as an excipient in the preparation of pills and troches, and as a suspending agent in mixtures.

SYRUPUS ACIDI CITRICI—Syrup of Citric Acid—**Syr. Acid. Cit.**

Must not be dispensed unless free from molds and fermentation products.

Prepared by dissolving 1 gm. citric acid in 1 mil. water and adding the solution to 95 mils syrup, mixing well, then adding 1 mil tincture of lemon peel, shaking the mixture, and lastly enough syrup to make 100 mils. Preserve the syrup in containers that have been previously washed with boiling water.

Agreeable and refrigerant addition to beverages.

SYRUPUS ACIDI HYDRIODICI—Syrup of Hydriodic Acid—**Syr. Acid. Hydriod.**

Contains 1.3 to 1.45 gm. HI (127.93).

A transparent, colorless, or not more than pale, straw-colored, syrupy liquid, sp. gv. about 1.215, having a sweet and acidulous *taste.*

Prepared by mixing together 12.5 mils diluted hydriodic acid, 30 mils distilled water, and 57.5 mils syrup.

Alterative. Dose, 4 mils.

SYRUPUS AURANTII—Syrup of Orange—**Syr. Aurant.**

Prepared by triturating 1.5 gm. purified talc in a mortar with 5 mils tincture of sweet orange peel, adding gradually 40 mils distilled water, filtering, and adding sufficient distilled water through the filter to make 45 mils filtrate; then dissolving in this filtrate 0.5 gm. citric acid and 82 gm. sugar by agitation without heat, and lastly adding enough distilled water to make 100 mils.

Flavoring.

SYRUPUS AURANTII FLORUM—Syrup of Orange Flowers—**Syr. Aurant. Flor.**

Prepared by dissolving 85 gm. sugar by agitation without heat in enough orange flower water to make 100 mils.

Also prepared by percolation, see page 403.

Perfumed flavoring.

SYRUPUS CALCII LACTOPHOSPHATIS—Syrup of Calcium Lactophosphate—**Syr. Calc. Lactophos.**

Prepared by mixing 6 mils lactic acid with 10 mils distilled water, gradually adding 2.5 gm. precipitated calcium carbonate, stirring until solution is effected; then adding 3.6 mils phosphoric acid, previously diluted with 5 mils distilled water, and stirring until the precipitate which formed is dissolved, then adding 10 mils distilled water, filtering, adding to the filtrate 5 mils stronger orange flower water, 5 mils glycerine, 65 gm. sugar, agitating until solution is effected, and lastly enough distilled water to make 100 mils, straining if necessary.

This syrup affords calcium phosphate in the form of soluble calcium lactophosphate.

Restorative tonic in cases of calcium deficiency. Dose, 10 mils.

SYRUPUS FERRI IODIDI—Syrup of Ferrous Iodide—**Syr. Ferr. Iod.**—*Syrup of Iodide of Iron*

Contains 4.75 to 5.25 per cent. FeI_2 (309.68).

Preserve in completely filled, tightly stoppered bottles.

Occurs as a transparent, pale yellowish-green, syrupy liquid, sp. gv. about 1.35, having a sweet, strongly ferruginous taste and a slightly acid reaction.

Prepared by allowing 4.15 gm. iodine to react on 1.25 gm. bright iron wire in small pieces, in the presence of 15 mils distilled water, until the solution has acquired a greenish color and lost the odor of iodine, then heating it to boiling and adding 5 gm. sugar; when the sugar has dissolved, filter the solution into 57.5 gm. of sugar, rinsing with 12.5 mils of distilled water, then heating upon a water-bath until solution is complete; lastly straining the syrup into a tared bottle containing 2 mils diluted hypophosphorous acid and adding sufficient distilled water to make 100 gm.

Alterative, hematinic. Dose, 1 mil.

SYRUPUS HYPOPHOSPHITUM—Syrup of Hypophosphites—**Syr. Hypophos.**

Prepared by dissolving 4.5 gm. calcium hypophosphite, 1.5 gm. each of potassium and sodium hypophosphite in 50 mils distilled water; then adding 0.2 mil diluted hypophosphorous acid, filtering and washing to 54 mils, then adding 5 mils glycerin and 60 gm. sugar, dissolving the latter by agitation without heat, and lastly enough distilled water to make 100 mils, straining if necessary.

Reconstructive tonic. Dose, 10 mils.

SYRUPUS IPECACUANHÆ—Syrup of Ipecac—**Syr. Ipecac.**

Prepared by diluting 7 mils fluidextract of ipecac with 30 mils water to which 1 mil of acetic acid has been added, filtering the mixture after twenty-four hours, and diluting to 45 mils; then adding to this filtrate 10 mils glycerin, 70 gm. sugar, and after solution has been effected diluting with water to make 100 mils.

Also prepared by percolation.

Expectorant, emetic. Dose as expectorant, 1 mi
15 mils.

SYRUPUS LACTUCARII — Syrup of Lactucarium — **Syr. Lactucar.**

Prepared by mixing together 10 mils tincture of lactucarium, 20 mils glycerin, 5 mils orange flower-water containing 0.1 gm. citric acid, filtering if necessary, and then adding sufficient syrup to make 100 mils.

Anodyne, antispasmodic. Dose, 10 mils.

SYRUPUS PICIS LIQUIDÆ—Syrup of Tar—**Syr. Pic. Liq.**

Prepared by dissolving 0.5 gm. tar in 5 mils alcohol, adding 1 gm. magnesium carbonate and 5 gm. sugar, triturating thoroughly; then adding 41 mils water, filtering the mixture after standing two hours, dissolving 80 gm. sugar in the clear filtrate, straining, and adding sufficient water through the strainer to make 100 mils.

Also prepared by percolation.

Expectorant. Dose, 4 mils.

SYRUPUS PRUNI VIRGINIANÆ—Syrup of Wild Cherry—**Syr. Prun. Virg.**

Preserve in non-metallic, tightly closed containers, in a cool place, as it rapidly loses hydrocyanic acid even under the most favorable conditions.

Prepared by extracting 15 gm. wild cherry bark in No. 20 powder with an aqueous menstruum containing 5 mils glycerin; dissolving in the 50 mils percolate so obtained 80 gm. sugar by agitation without heat, and lastly adding enough water to make 100 mils.

Also prepared by percolation.

Tonic, nerve sedative, flavoring. Dose, 4 mils.

SYRUPUS RHEI—Syrup of Rhubarb—**Syr. Rhei**

Prepared by mixing 10 mils fluidextract of rhubarb, 0.4 mil spirit of cinnamon, 1 gm. potassium carbonate dissolved in 5 mils water, with sufficient syrup to make 100 mils.

Mild cathartic. Dose, 10 mils.

SYRUPUS RHEI AROMATICUS—Aromatic Syrup of Rhubarb —**Syr. Rhei Arom.**—*Spiced Syrup of Rhubarb*

Prepared by dissolving 0.1 gm. potassium carbonate in 15 mils aromatic tincture of rhubarb and adding sufficient syrup to make 100 mils.

Stomachic, laxative. Dose, 10 mils.

SYRUPUS SARSAPARILLÆ COMPOSITUS — Compound Syrup of Sarsaparilla—**Syr. Sarsap. Co.**

Prepared by mixing 20 mils fluidextract of sarsaparilla, 1.5 mils each of fluidextract of glycyrrhiza and fluidextract of senna, 0.02 mil each of oil of sassafras, oil of anise, and methyl salicylate, and 1.94 mils alcohol with 75 mils syrup.

Adjuvant and flavoring for alterative preparations. Dose, 15 mils.

SYRUPUS SCILLÆ—Syrup of Squill—**Syr. Scill.**

Prepared by dissolving 80 gm. sugar in 45 mils vinegar of squill by the aid of gentle heat, and adding enough distilled water to the strained liquid, when cold, to make 100 mils.

Expectorant, emetic. Dose, 2 mils.

SYRUPUS SCILLÆ COMPOSITUS—Compound Syrup of Squill—**Syr. Scill. Co.**—*Hive Syrup*

Prepared by adding a solution of 0.2 gm. antimony and potassium tartrate in 1 mil hot distilled water to 75 mils syrup, then adding a mixture containing 8 mils each of fluidextract of squill and fluidextract of senega, and following with enough syrup to make 100 mils.

Emetic, diaphoretic, expectorant. Dose, 2 mils.

SYRUPUS SENEGÆ—Syrup of Senega—**Syr. Seneg.**

Prepared by mixing 20 mils fluidextract of senega with en syrup to make 100 mils.

Stimulant, expectorant. Dose, 4 mils.

SYRUPUS SENNÆ—Syrup of Senna—**Syr. Senn.**

Prepared by mixing 25 mils fluidextract of senna and 0.5 mil oil of coriander with enough syrup to make 100 mils.

Laxative. Dose, 4 mils.

SYRUPUS TOLUTANUS—Syrup of Tolu—**Syr. Tolu.**

Prepared by rubbing in a mortar 5 mils tincture of tolu with 1 gm. magnesium carbonate and 6 gm. sugar, then gradually adding 43 mils of water, filtering, dissolving in the filtrate by the aid of gentle heat 76 gm. sugar, straining while hot, and diluting through the strainer with sufficient water to make 100 mils.

Also prepared by percolation.

Expectorant, adjuvant in expectorant preparations. Dose, 15 mils.

SYRUPUS ZINGIBERIS—Syrup of Ginger—**Syr. Zingib.**

Prepared by mixing 3 mils fluidextract of ginger with 2 mils alcohol and triturating the mixture in a mortar with 1 gm. magnesium carbonate and 6 gm. sugar, then gradually adding 43 mils of water, filtering, dissolving in the clear filtrate with the aid of gentle heat 72 gm. sugar, straining the hot liquid, and adding water to make 100 mils.

Stomachic, adjuvant to purgative preparations, flavoring. Dose, 15 mils.

TABELLÆ—TABLETS

Origin.—L. *tabella*, a small plate.

Pharmacopœial, 1; U. S. P. VIII, none; N. F., none.

Definition.—In general, tablets are small, hard, disk-shaped or lenticular masses of medicinal substances.

Methods of Preparation.—Tablets are of two types, Compressed Tablets and Triturate Tablets.

Compressed Tablets are prepared from dry, usually granular material, by compression in suitable machines.

Triturate Tablets, tablet triturates, are prepared by moistening medicated powders (trit[illegible]ith a volatile liquid (70 per cent. alcohol or be[illegible] into a perforated plate, made for the purpose; ejecting the tablets and allowing them to harden through the evaporation of the liquid. A popular basis is sugar of milk, 5 parts, and cane-sugar, 1 part. The customary weight of the tablet is 60 mg., but the range is from 30 to 240 mg.

Hypodermic Tablets (tabellæ hypodermicæ) may be of either type, compressed or triturate. Special care is necessary to insure asepsis and only the least irritant basis must be used: dried neutral sodium sulphate, pure sodium chloride, or a specially prepared sugar of milk.

Tablet Saturates.—Tablets are sometimes made from cane-sugar without medication (blank tablets), to be medicated as occasion requires by saturating them with an alcoholic solution of the medicament. When so saturated they are called tablet saturates. Compare *Orbicules*, page 446.

Advantage of Class.—Tablets can be easily, quickly, and cheaply made in large quantities. They present the medicament in accurately apportioned doses, convenient for dispensing and administering. Their sometimes rather slow rate of absorption in the system is a point in their disfavor.

Incompatibilities.—They may be said to have none.

Preservation.—They are best preserved in amber-colored glass bottles, though cartons may answer in some cases. Hypodermic tablets should be kept in small sealed glass tubes.

Administration.—They may, according to requirements, be swallowed, like pills; dissolved in the mouth, like troches; crushed and administered like powders, or dissolved or disintegrated in water and administered in solution or mixture. Hypodermic tablets should be dissolved in sterile distilled water in the barrel of the hypodermic syringe and administered subcutaneously.

TOXITABELLÆ HYDRARGYRI CHLORIDI CORROSIVI (IX)—Poison Tablets of Corrosive Mercuric Chloride—Toxitabel. Hydrarg. Chlor. Corr.—*Corrosive Sublimate Tablets; Bichloride Tablets*

Weight about 1 gm. and containing 0.45 to 0.55 gm. corrosive mercuric chloride ($HgCl_2$ = 271.52), the remainder being chiefly sodium chloride ($NaCl$ = 58.46).

Dispense in securely stoppered glass containers bearing a red label on which is the word "POISON" and a statement that the tablets contain the required amount of corrosive mercuric chloride.

Blue, angular shaped (not discoid) tablets each having the word "POISON" and the skull and cross bones distinctly stamped upon it.

The tablets are preferably colored with sodium indigotindisulphonate. One tablet dissolved in 500 mils, or 1 pint, of water makes a solution of mercuric chloride approximately 1 : 1000. The sodium chloride present aids in the solution of the mercuric chloride.

Antiseptic.

TINCTURÆ—TINCTURES

Origin.—L. *tingere*, to color; therefore, literally, a colored preparation.

Pharmacopœial, 54; U. S. P. VIII, 63; N. F., 48, and two general formulas.

Definition.—Tinctures are alcoholic or hydro-alcoholic solutions, weaker than fluidextracts, prepared by extracting the valuable principles from drugs by means of appropriate menstrua. Tincture of Ferric Chloride and Tincture of Iodine are exceptions, being solutions of chemical substances in alcohol.

Methods of Preparation.—They are prepared by two type processes.

"I. Process P—Percolation:

Moisten the powdered drug or mixed drugs designated in the formula with a sufficient quantity of the prescribed menstruum to render it evenly and distinctly damp, transfer it to a percolator, and, without pressing the powder, allow it to stand well covered for six hours; then pack it firmly, unless otherwise directed, and pour on enough of the menstruum to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator, close the lower orifice, and, having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed slowly (about 20 drops per minute), gradually adding sufficient menstruum to ma 1000 mils of finished tincture.

"Modification for Assayed Tinctures: In tinctures that are directed to be assayed, allow the percolation to proceed until the percolate measures 950 mils. Assay a sample of this percolate as directed, and from the alkaloidal content thus determined ascertain by calculation the amount of alkaloids in the remainder of the liquid, and add to this enough of the menstruum to make the finished tincture conform to the required alkaloidal standard."

"II. Process M—Maceration:

Macerate the drug or mixed drugs designated in the formula in a stoppered container, in a moderately warm place, with 750 mils of the prescribed solvent (unless a different amount is specified in the formula). Continue the maceration with frequent agitation during three days or until the drug is practically extracted, transfer the mixture to a filter, and, when the liquid has drained off completely, gradually wash the residue on the filter with enough of the menstruum to make 1000 mils of finished tincture."

Advantage of Class.—Tinctures are the best liquid preparations of highly active drugs. They commend themselves for their ease in preparation, their permanency, and their reliability. The quantity of menstruum is sufficient to completely exhaust the drug and sufficiently alcoholic to preserve the active constituents. The injurious effects of heating are avoided and the dose is sufficiently large to be conveniently measured.

Incompatibilities.—Many of the tinctures are pharmaceutically incompatible with aqueous preparations, forming cloudy mixtures in which the active principle is the one frequently thrown out of solution. This is generally true of the alcoholic tinctures with the exception of Ferric Chloride and Iodine, and of the hydro-alcoholic tinctures having a menstruum containing more than 65 volumes of alcohol in 100. The others bear moderate dilution with the notable exception of Tincture of Hydrastis. If it is desired to dilute any of these tinctures some alcoholic preparation like aromatic elixir is recommended. If this is impossible, affix a shake label. Most vegetable drugs contain some form of tannic acid, and hence their tinctures form inky preparations with solutions of iron salts. Important exce tions are tinctures of Quassia, Sweet Orange Peel, and Calu

SYNOPSIS OF TINCTURES

Tinctures.	Drug strength.	Process.	Menstruum.	Standard.	Dose.
Aconiti	10 g/m.	P	A 7, W 3	0.045 to 0.055 g/m e. s. a. Biologic, 0.0004 mil	0.3 mil
Aloes	10 g/m.	M	Dil. Alc.		2 mils
Arnicæ	20 g/m.	Special	Dil. Alc.		1 mil
Asafœtidæ	20 g/m.	M	Alcohol		1 mil
Aurantii Amari	20 g/m.	P	A 3, W 2		4 mils
Aurantii Dulcis	50 g/m.	M	Alcohol		4 mils
Belladonnæ Foliorum	10 g/m.	P	Dil. Alc.	0.027 to 0.033 g/m a.	0.75 mil
Benzoini	20 g/m.	M	Alcohol		1 mil
Benzoini Composita	24 g/m.	M	Alcohol		2 mils
Calumbæ	20 g/m.	P	A 3, W 2		4 mils
Cannabis	10 g/m.	P	Alcohol	Biologic, 0.3 mil per kg.	0.75 mil
Cantharidis	10 g/m.	Special	Alcohol		0.1 mil
Capsici	10 g/m.	P	A 95, W 5		0.5 mil
Cardamomi	15 g/m.	P	Dil. Alc.		2 mils
Cardamomi Composita	6.2 g/m.	M	Dil. Alc. 95, G. 5 (Dil. Alc.)		4 mils
Cinchonæ	20 g/m.	P	A 67.5, G 7.5, W 25 (A 2, W 1)	0.8 to 1 g/m a.	4 mils
Cinchonæ Composita	20 g/m.	P	A 67.5, G 7.5, W 25 (A 2, W 1)	0.4 to 0.5 g/m	4 mils
Cinnamomi	20 g/m.	P	A 67.5, G 7.5, W 25		2 mils
Colchici Seminis	10 g/m.	P	A 3, W 2	0.036 to 0.044 g/m Colchicine	2 mils
Digitalis	10 g/m.	P	A 3, W 1	Biologic, 0.006 mil per gm.	0.5 mil

Tinctures.	Drug strength.	Process.	Menstruum.	Standard.	Dose.
Ferri Chloridi.........	35 m/m. Sol. $FeCl_3$	Solution	Alcohol	13 per cent. $FeCl_3$	0.5 mil
Gambir Composita....	7.5 g/m.	M	Dil. Alc.		4 mils
Gelsemii	10 g/m.	P	A 65, W 35		0.25 mil
Gentianæ Composita...	15 g/m.	P	G 10, A 50, W 40 (Dil. Alc.)		4 mils
Guaiaci.............	20 g/m.	M	Alcohol		4 mils
Guaiaci Ammoniata...	20 g/m.	M	Arom. Sp. Ammon.		2 mils
Hydrastis...........	20 g/m.	P	A 2, W 1	0.36 to 0.44 g/m e. s. a.	4 mils
Hyoscyami..........	10 g/m.	P	Dil. Alc.	0.0055 to 0.0075 g/m t. a.	2 mils
Iodi................	I, 7 g/m. KI, 5 g/m.	Special	W 5, A q. s.	6.5 to 7.5 g/m I 4.5 to 5.5 g/m KI	0.1 mil.
Kino................	10 g/m.	Special	A 50, W 50		4 mils
Lactucarii...........	50 g/m.	Special	A 50, W 25, G 25 (Dil. Alc.)		2 mils
Lavandulæ Composita .	Ol. Lavand., 0.8 m/m. Ol. Rosmar., 0.2 m/m. Saigon Cinnam., 2 g/m. Clove, 0.5 g/m. Myrist., 1 g/m. Red Saunders, 1 g/m.	M	A 75, W 25 (A 3, W 1)		2 mils
Limonis Corticis......	50 g/m.	M	Alcohol		4 mils
Lobeliæ..............	10 g/m.	P	Dil. Alc.		1 mil.
Moschi..............	5 g/m.	Special	A 45, W 45 (Dil. Alc.)		4 mils
Myrrhæ.............	20 g/m.	M	Alcohol		1 mil
Nucis Vomicæ........	10 g/m.	P	A 3, W 1	0.237 to 0.263 g/m t. a.	0.5 mil
Opii................	10 g/m.	Special	Dil. Alc.	0.95 to 1.05 g/m Morph.	0.5 mil

Opii Camphorata	Pulv. Opium, 0.4 g/m. Benz. Acid., 0.4 g/m. Camph., 0.4 g/m. Ol. Anisi, 0.4 g/m.	M	Dil. Alc. 95, G 4 (Dil. Alc.)		4 mils
Opii Deodorati	10 g/m.	Special	A 20, W q. s.	0.95 to 1.05 g/m Morph.	0.5 mil
Physostigmatis	10 g/m.	P	Alcohol	0.013 to 0.017 g/m a.	1 mil
Pyrethri	20 g/m.	P	Alcohol		External
Quassiæ	20 g/m.	P	A 1, W 2		2 mils
Rhei	Rhubarb, 20 g/m. Cardam. Seed, 3 g/m.	P	A 50, W 40, G 10 (Dil. Alc.)		4 mils
Rhei Aromatica	Rhubarb, 20 g/m. Saigon Cinnam., 4 g/m. Clove, 4 g/m. Myrist., 2 g/m.	P	A 50, W 40, G 10 (Dil. Alc.)		2 mils
Sanguinariæ	Sanguin., 10 g/m. Acid. Hydrochlor., 1 g/m.	Special	A 60, W 40, HCl 1		1 mil
Scillæ	10 g/m.	Special	A 3, W 1	Biologic, 0.006 mil per gm.	1 mil.
Stramonii	10 g/m.	P	Dil. Alc.	0.0225 to 0.0275 g/m t. a.	0.5 mil
Strophanthi	10 g/m.	Special	Alcohol	Biologic, 0.00006 mil pr gm.	0.5 mil
Tolutana	20 g/m.	M	Alcohol		2 mils
Valerianæ	20 g/m.	P	A 3, W 1		4 mils
Valerianæ Ammoniata	20 g/m.	P	Sp. Ammon. Arom.		2 mils
Veratri Viridis	10 g/m.	P	Alcohol		0.5 mil
Zingiberis	20 g/m.	P	Alcohol		2 mils

Tincture of Ferric Chloride and Tincture of Sanguinaria are acid in reaction and the ammoniated tinctures are alkaline in reaction, and they, therefore, have the same incompatibilities as acids and alkalies respectively. The alkaloidal tinctures, unless very strongly alcoholic, have the same incompatibilities as their alkaloids. See *Alkaloids*, page 196.

Preservation.—They are best preserved in closely stoppered bottles, in a moderately cool place, protected from light.

Administration.—The tinctures are best administered diluted with a little water or milk. The latter is excellent for masking the taste of sharp and acrid bodies, such as tincture of capsicum, etc.

TINCTURA ACONITI—Tincture of Aconite—**Tr. Aconit.**

Contains 0.045 to 0.055 g/m ether-soluble alkaloids. If assayed biologically, the M. L. D. should not be greater than 0.0004 mil per gm. of body weight of guinea-pig.

Prepared by percolating 10 gm. aconite in No. 60 powder with sufficient menstruum, A. 7 volumes and W. 3 volumes, to make about 100 mils.

Local analgesic, circulatory depressant. Dose, 0.3 mil.

TINCTURA ALOES—Tincture of Aloes—**Tr. Aloes**

Prepared by macerating 10 gm. aloes in No. 40 powder and 20 gm. glycyrrhiza in No. 40 powder with sufficient diluted alcohol to make 100 mils.

Cathartic, emmenagogue. Dose, 2 mils.

TINCTURA ARNICÆ—Tincture of Arnica—**Tr. Arnic.**

Prepared by moistening 20 gm. arnica in No. 20 powder with 50 mils diluted alcohol, transferring it to a percolator, and, without pressing the powder, allowing it to stand well covered for twenty-four hours, then packing it with moderate pressure and allowing the percolation to proceed slowly, pouring on additional diluted alcohol as needed; when the percolate measures 25 mils, stopping the flow, then macerating the drug for an additional twenty-four hours and continuing the percolation until the total percolate measures 50 mils; again interrupting the percolation and macerating the drug for twelve hours and afterward collecting an additional 25 mils of percolate; again interrupting the percolation and macerating the drug for another twelve hours, then allowing the percolation to proceed slowly until the total volume of the percolates measures 100 mils.

Used externally in lotions and liniments, rarely administered internally. Dose, 1 mil.

TINCTURA ASAFŒTIDÆ—Tincture of Asafetida—**Tr. Asafœt.**

Prepared by macerating 20 gm. bruised asafetida with sufficient alcohol to make 100 mils.

Carminative, antispasmodic, antihysteric. Dose, 1 mil.

TINCTURA AURANTII AMARI—Tincture of Bitter Orange Peel—**Tr. Aurant. Amar.**

Prepared by percolating 20 gm. bitter orange peel in No. 40 powder with sufficient menstruum, A. 3 volumes and W. 2 volumes, to make 100 mils.

Stomachic, flavoring. Dose, 4 mils.

TINCTURA AURANTII DULCIS—Tincture of Sweet Orange Peel—**Tr. Aurant. Dulc.**

Prepared by macerating 50 gm. sweet orange peel, grated from the fresh fruit, with 100 mils alcohol, filtering through purified cotton, and adding sufficient alcohol to make 100 mils.

An ingredient in syrup of orange, 5 m/m.

Flavoring. Dose, 4 mils.

TINCTURA BELLADONNÆ FOLIORUM—Tincture of Belladonna Leaves—**Tr. Bellad. Fol.**

Contains 0.027 to 0.033 g/m total alkaloids.

Prepared by percolating 10 gm. belladonna lea
powder with sufficient diluted alcohol to make a

Antispasmodic, circulatory and respiratory st
0.75 mil.

TINCTURA BENZOINI—Tincture of Benzoin—**Tr. Benz.**

Prepared by macerating 20 gm. benzoin in No. 40 powder in sufficient alcohol to make 100 mils.

Antiseptic, expectorant, diuretic. Dose, 1 mil.

TINCTURA BENZOINI COMPOSITA—Compound Tincture of Benzoin—**Tr. Benz. Co.**

Prepared by macerating 10 gm. benzoin in No. 40 powder, 2 gm. aloes in No. 40 powder, 8 gm. storax, and 4 gm. balsam of tolu in sufficient alcohol to make 100 mils.

Expectorant, vulnerary. Dose, 2 mils.

TINCTURA CALUMBÆ—Tincture of Calumba—**Tr. Calumb.**

Prepared by percolating 20 gm. calumba in No. 20 powder with sufficient menstruum, A. 3 volumes and W. 2 volumes, to make 100 mils.

Bitter stomachic. Dose, 4 mils.

TINCTURA CANNABIS—Tincture of Cannabis—**Tr. Cannab.** —*Tincture of Indian Cannabis,* U. S. P. VIII

Biologically assayed. Should produce incoördination in dogs when administered in a dose of not more than 0.3 mil per kilogram of body weight.

Prepared by percolating 10 gm. cannabis in No. 40 powder with sufficient alcohol to make about 100 mils.

Analgesic, narcotic. Dose, 0.75 mil.

TINCTURA CANTHARIDIS—Tincture of Cantharides—**Tr. Canthar.**

Prepared by placing 10 gm. cantharides in No. 60 powder in a strong tin container, which may be tightly closed and which has a capacity of not less than 200 mils; adding about 90 mils alcohol, agitating the mixture thoroughly, and inserting in the opening of the can a tightly fitting cork through which passes a glass tube not less than 6.4 mm. in diameter and 75 length; placing the can on a water-bath and maint temperature of 50° to 55° C. for twenty-four hours, quent agitation; then removing it from the water-bath, pouring the contents into a cylindric percolator, in the neck of which has been placed a pledget of purified cotton, allowing the percolation to proceed, and after the liquid has disappeared from the surface and ceased to drop from the percolator, gradually pouring on sufficient alcohol to make 100 mils.

Vesicant, diuretic, aphrodisiac. Dose, 0.1 mil.

TINCTURA CAPSICI—Tincture of Capsicum—Tr. Capsic.

Prepared by percolating 10 gm. capsicum in No. 50 powder with sufficient menstruum, A. 95 volumes and W. 5 volumes, to make 100 mils.

Carminative, stomachic. Dose, 0.5 mil.

TINCTURA CARDAMOMI—Tincture of Cardamom—Tr. Cardam.

Prepared by percolating 15 gm. cardamom seed in No. 40 powder with sufficient diluted alcohol to make 100 mils.

Carminative, stomachic, flavoring. Dose, 2 mils.

TINCTURA CARDAMOMI COMPOSITA—Compound Tincture of Cardamom—Tr. Cardam. Co.

Prepared by macerating 2 gm. cardamom seed in No. 40 powder, 2.5 gm. saigon cinnamon in No. 60 powder, 1.2 gm. caraway in No. 40 powder, and 0.5 gm. cochineal in No. 60 powder in 75 mils of a menstruum composed of diluted alcohol 95 mils and G. 5 mils, and completing the process with sufficient diluted alcohol to make 100 mils.

Aromatic adjuvant. Dose, 4 mils.

TINCTURA CINCHONÆ—Tincture of Cinchona—Tr. Cinch.

Contains 0.8 to 1 g/m total alkaloids.

Prepared by percolating 20 gm. cinchona in No. 40 powder with a menstruum composed of A. 67.5 mils, W. 25 mils, and G. 7.5 mils, and completing the process with sufficient menstruum, A. 2 volumes and W. 1 volume, to make about 100 mils.

Antimalarial, bitter tonic. Dose, 4 mils.

TINCTURA CINCHONÆ COMPOSITA—Compound Tincture of Cinchona—Tr. Cinch. Co.—*Huxham's Tincture of Bark*

Contains 0.4 to 0.5 g/m total alkaloids.

Prepared by percolating 10 gm. red cinchona in No. 40 powder, 8 gm. bitter orange peel in No. 40 powder, and 2 gm. serpentaria in No. 60 powder with a menstruum composed of A. 67.5 mils, W. 25 mils, and G. 7.5 mils, and completing the process with sufficient menstruum, A. 2 volumes and W. 1 volume, to make about 100 mils.

Stomachic, tonic. Dose, 4 mils.

TINCTURA CINNAMOMI — Tincture of Cinnamon — Tr. Cinnam.

Prepared by percolating 20 gm. saigon cinnamon in No. 50 powder with sufficient menstruum, A. 67.5 volumes, W. 25 volumes, and G. 7.5 volumes, to make 100 mils.

Flavoring, adjuvant. Dose, 2 mils.

TINCTURA COLCHICI SEMINIS—Tincture of Colchicum Seed—Tr. Colch. Sem.

Contains 0.036 to 0.044 g/m colchicine.

Prepared by percolating 10 gm. colchicum seed in No. 50 powder with sufficient menstruum, A. 3 volumes and W. 2 volumes, to make about 100 mils.

Alterative in gout. Dose, 2 mils.

TINCTURA DIGITALIS—Tincture of Digitalis—Tr. Digit.

If assayed biologically the M. L. D. should not be greater than 0.006 mil for each gm. body weight of frog.

Prepared by percolating 10 gm. digitalis in No. 60 powder with sufficient menstruum, A. 3 volumes and W. 1 volume, to make about 100 mils.

Heart stimulant. Dose, 0.5 mil.

TINCTURA FERRI CHLORIDI—Tincture of Ferric Chlori
Tr. Ferr. Chlor.

Contains about 13 per cent. $FeCl_3$ (162.22), corresp
4.48 per cent. Fe. Protect from light to avoid re
the iron to ferrous.

Preserve in a glass-stoppered, amber-colored bottle.

A bright, amber-colored liquid, sp. gv. about 1.000, having a slightly ethereal odor, a very styptic, astringent taste, and an acid reaction.

Prepared by diluting 35 mils solution of ferric chloride with sufficient alcohol to make 100 mils. Age it at least three months before dispensing. This allows time for chemical action to take place between the free acid of the solution and the alcohol, producing a small amount of chloric ether and other compounds, which are supposed to be diuretic, and which give to it its peculiar flavor.

An ingredient in solution of iron and ammonium acetate, 4 m/m.

Hematinic. Dose, 0.5 mil.

TINCTURA GAMBIR COMPOSITA—Compound Tincture of Gambir—Tr. Gambir Co.

Prepared by macerating 5 gm. gambir in No. 50 powder and 2.5 gm. saigon cinnamon in No. 50 powder with sufficient diluted alcohol to make 100 mils.

Astringent. Dose, 4 mils.

TINCTURA GELSEMII—Tincture of Gelsemium—Tr. Gelsem.

Prepared by percolating 10 gm. gelsemium in No. 60 powder with sufficient menstruum, A. 65 volumes and W. 35 volumes, to make 100 mils.

Antispasmodic, antineuralgic. Dose, 0.25 mil.

TINCTURA GENTIANÆ COMPOSITA—Compound Tincture of Gentian—Tr. Gentian. Co.

Prepared by percolating 10 gm. gentian in No. 40 powder, 4 gm. bitter orange peel in No. 40 powder, and 1 gm. cardamom seed in No. 40 powder with a menstruum consisting of A. 50 mils, W. 40 mils, and G. 10 mils, and completing the process with sufficient diluted alcohol to make 100 mils.

Digestive tonic. Dose, 4 mils.

TINCTURA GUAIACI—Tincture of Guaiac—**Tr. Guaiac.**

Prepared by macerating 20 gm. guaiac in No. 40 powder with sufficient alcohol to make 100 mils.

Diaphoretic, diuretic, alterative in gout. Dose, 4 mils.

TINCTURA GUAIACI AMMONIATA—Ammoniated Tincture of Guaiac—**Tr. Guaiac. Ammon.**

Prepared by macerating 20 gm. guaiac in No. 40 powder with sufficient aromatic spirit of ammonia to make 100 mils.

Antirheumatic. Dose, 2 mils.

TINCTURA HYDRASTIS—Tincture of Hydrastis—**Tr. Hydrast.**—*Tincture of Golden Seal*

Contains 0.36 to 0.44 g/m ether-soluble alkaloids.

Prepared by percolating 20 gm. hydrastis in No. 60 powder with sufficient menstruum, A. 2 volumes and W. 1 volume, to make about 100 mils.

Bitter tonic, alterative. Dose, 4 mils.

TINCTURA HYOSCYAMI—Tincture of Hyoscyamus—**Tr. Hyoscy.**—*Tincture of Henbane*

Contains 0.0055 to 0.0075 g/m total alkaloids.

Prepared by percolating 10 gm. hyoscyamus in No. 60 powder with sufficient diluted alcohol to make about 100 mils.

Hypnotic, antispasmodic. Dose, 2 mils.

TINCTURA IODI—Tincture of Iodine—**Tr. Iodi**

Contains 6.5 to 7.5 g/m iodine (I, 126.92) and 4.5 to 5.5 g/m potassium iodide (KI, 166.02).

Prepared by dissolving 7 gm. iodine in 5 mils distilled water containing 5 gm. potassium iodide, and diluting with alcohol to 100 mils.

Used externally as rubefacient, antiseptic, alterative. Dose, 0.1 mil.

TINCTURA KINO—Tincture of Kino—**Tr. Kino**

Preserve in tightly stoppered bottles, in a cool place, prote *from light.*

Prepared by placing 10 gm. kino in a capacious flask and pouring on it 50 mils of boiling water, agitating the mixture thoroughly, then heating it on a water-bath containing boiling water for one hour, shaking it frequently; then allowing the liquid to cool, adding enough recently boiled water to make the product measure 50 mils, then adding 50 mils alcohol, stoppering the flask, setting it aside in a cool place for twenty-four hours, and then decanting the mixture through cheese-cloth.

Astringent. Dose, 4 mils.

TINCTURA LACTUCARII—Tincture of Lactucarium—**Tr. Lactucar.**

Prepared by beating 50 gm. lactucarium with clear sand in an iron mortar to a coarse powder, and then transferring it to a bottle, adding 200 mils purified petroleum benzin, corking the bottle tightly and setting it aside for forty-eight hours, frequently agitating the mixture; then pouring the mixture on a double filter, covering the funnel, and when the liquid has passed through the filter, washing the residue gradually with 150 mils purified petroleum benzin, and then allowing the lactucarium to dry by exposing it in a current of air; when it is dry and free from the odor of benzin, reducing it to a powder, using more sand if necessary, and packing it moderately in a conical percolator; then mixing 25 mils glycerin with 25 mils water and 50 mils alcohol, and gradually pouring this mixture on the powder; when the liquid begins to drop from the percolator, closing the lower orifice, and, having closely covered the percolator, macerating for twenty-four hours; then allowing the percolation to proceed slowly, gradually adding first the remainder of the menstruum, and then diluted alcohol until the drug is exhausted; reserving the first 75 mils of percolate, evaporating the remainder on a water-bath at a temperature not exceeding 70° C. until it measures 25 mils, mixing this with the reserved portion; filtering the mixed liquids and washing the filter with sufficient diluted alcohol to make 100 mils.

An ingredient in syrup of lactucarium, 10 m/m.

Anodyne, antispasmodic. Dose, 2 mils.

TINCTURA LAVANDULÆ COMPOSITA—Compound Tincture of Lavender—**Tr. Lavand. Co.**—*Compound Spirit of Lavender*

Prepared by macerating 2 gm. saigon cinnamon in No. 50 powder, 0.5 gm. clove in No. 50 powder, and 1 gm. each of myristica and red saunders, in No. 50 powder in 75 mils alcohol in which 0.8 mil oil of lavender and 0.2 mil oil of rosemary have been dissolved, and completing the preparation with sufficient menstruum, A. 3 volumes and W. 1 volume, to make 100 mils.

An ingredient in solution of potassium arsenite, 3 per cent.

Carminative, coloring. Dose, 2 mils.

TINCTURA LIMONIS CORTICIS—Tincture of Lemon Peel—**Tr. Limon. Cort.**

Prepared by macerating 50 gm. grated peel, from fresh lemons, in sufficient alcohol to make 100 mils.

An ingredient in syrup of citric acid, 1 m/m.

Adjuvant, flavoring. Dose, about 4 mils.

TINCTURA LOBELIÆ—Tincture of Lobelia—**Tr. Lobel.**

Prepared by percolating 10 gm. lobelia in No. 50 powder with sufficient diluted alcohol to make 100 mils.

Expectorant, anti-asthmatic. Dose, 1 mil.

TINCTURA MOSCHI—Tincture of Musk—**Tr. Mosch.**

Prepared by triturating 5 gm. musk with 45 mils water, gradually added until a smooth mixture is obtained; transferring this to a bottle and allowing the mixture to macerate for twenty-four hours; then adding 45 mils alcohol and macerating the mixture for six days, with occasional agitation; transferring this mixture to a plain paper filter and, when the liquid has drained off completely, washing the residue on the filter with sufficient diluted alcohol to make 100 mils.

Antispasmodic, general stimulant. Dose, 4 [illegible]

TINCTURA MYRRHÆ—Tincture of Myrrh—**Tr. Myrrh.**

Prepared by macerating 20 gm. of myrrh in moderately coarse powder with sufficient alcohol to make 100 mils.

Antiseptic, carminative, expectorant. Dose, 1 mil.

TINCTURA NUCIS VOMICÆ—Tincture of Nux Vomica—**Tr. Nuc. Vom.**

Contains 0.237 to 0.263 g/m t. a.

Prepared by percolating 10 gm. nux vomica in No. 40 powder with sufficient menstruum, A. 3 volumes, W. 1 volume, to make about 100 mils.

Stomachic, motor excitant, circulatory and respiratory stimulant. Dose, 0.5 mil.

TINCTURA OPII—Tincture of Opium—**Tr. Opii**—*Laudanum*

Contains 0.95 to 1.05 g/m anhydrous morphine.

Prepared by pouring 40 mils boiling water on 10 gm. granulated opium, contained in a tared vessel, weighing, and then stirring the mixture occasionally during twelve hours, restoring the original weight by the addition of water, adding 40 mils alcohol, pouring the mixture into a bottle and continuing the maceration for forty-eight hours, occasionally shaking the mixture; then transferring the mixture to a percolator, returning the first portion of the percolate until it runs through clear, and when the original menstruum has ceased to drop, continuing the percolation slowly, gradually adding sufficient diluted alcohol to make about 100 mils.

Anodyne, hypnotic, sedative. Dose, 0.5 mil.

TINCTURA OPII CAMPHORATA—Camphorated Tincture of Opium—**Tr. Opii Camph.**—*Paregoric*

Prepared by macerating 0.4 gm. each of powdered opium, benzoic acid, and camphor and 0.4 mil oil of anise in a mixture of 4 mils glycerin and 95 mils diluted alcohol, and completing the preparation with sufficient diluted alcohol to make 100 mils.

An ingredient in compound mixture of glycyrrhiza, 12 m/m.

Anodyne, antidiarrheal. Dose, 4 mils.

TINCTURA OPII DEODORATI—Tincture of Deodorized Opium—**Tr. Opii Deod.**

Contains 0.95 to 1.05 g/m anhydrous morphine.

Prepared as follows: Pour 50 mils boiling water on 10 gm. granulated opium contained in a suitable vessel and stir the mixture frequently during twenty-four hours; then transfer the mixture to a percolator, returning the first portions of the percolate until it runs through clear, and, when the original menstruum has ceased to drop, continue the percolation slowly, gradually adding water until the opium is practically exhausted; concentrate this percolate by evaporation on a water-bath until it measures 15 mils; then cool it and transfer it to a bottle, add 6.5 mils purified petroleum benzin, and stopper the bottle. Shake the mixture frequently during ten minutes; then separate the benzin layer, and repeat the "shaking out" with 1 mil of purified petroleum benzin (carefully and completely separate the benzin layer each time). Allow the aqueous liquid to evaporate spontaneously in a warm place until the odor of benzin has almost disappeared; remove the remaining traces of odor by cautious heating on a water-bath; add 60 mils water, filter the liquid, add 20 mils alcohol to the filtrate, and wash the residue on the filter with sufficient water to make 95 mils; assay and adjust the volume accordingly.

Anodyne, hypnotic, sedative. A much more agreeable preparation to administer than the tincture of opium. Dose, 0.5 mil.

TINCTURA PHYSOSTIGMATIS—Tincture of Physostigma—**Tr. Physostig.**—*Tincture of Calabar Bean*

Contains 0.013 to 0.017 g/m alkaloids.

Prepared by percolating 10 gm. physostigma in No. 50 powder with sufficient alcohol to make about 100 mils.

Motor depressant. Dose, 1 mil.

TINCTURA PYRETHRI—Tincture of Pyrethrum—**Tr. Pyreth.** —*Tincture of Pellitory*

Prepared by percolating 20 gm. pyrethrum
der with sufficient alcohol to make 100 mils.

Rubefacient, irritant. Used externall

TINCTURA QUASSIÆ—Tincture of Quassia—**Tr. Quas.**

Prepared by percolating 20 gm. quassia in No. 50 powder with sufficient menstruum, A. 1 volume and W. 2 volumes, to make 100 mils.

Bitter stomachic. Dose, 2 mils.

TINCTURA RHEI—Tincture of Rhubarb—**Tr. Rhei**

Prepared by percolating 20 gm. rhubarb and 3 gm. cardamom seed, both in No. 40 powder, with a mixture of A. 50 mils, W. 40 mils, and G. 10 mils, and completing the process with sufficient diluted alcohol to make 100 mils.

Purgative, astringent, stomachic. Dose, 4 mils.

TINCTURA RHEI AROMATICA—Aromatic Tincture of Rhubarb—**Tr. Rhei Arom.**

Prepared by percolating 20 gm. rhubarb, 4 gm. saigon cinnamon, 4 gm. clove, and 2 gm. myristica, all in No. 40 powder, with a mixture of A. 50 mils, W. 40 mils, and G. 10 mils, completing the process with sufficient diluted alcohol to make 100 mils.

An ingredient in aromatic syrup of rhubarb, 15 m/m.

Astringent, antidiarrheal. Dose, 2 mils.

TINCTURA SANGUINARIÆ—Tincture of Sanguinaria—**Tr. Sanguin.**—*Tincture of Bloodroot*

Prepared by mixing 60 mils alcohol with 40 mils water, and moistening 10 gm. sanguinaria in No. 60 powder with a mixture of 30 mils of this menstruum with 1 mil hydrochloric acid, transferring the drug to a percolator, and without pressing, allowing it to stand, well covered, for six hours; then packing it firmly and pouring on enough menstruum to saturate the powder and leave a stratum above it; closing the lower orifice when the liquid begins to drop from the percolator, closely covering the percolator, and macerating for twenty-four hours; [illegible] allowing the percolation to proceed slowly, pouring on

um, made of alcohol and water in the same

make 100 mils.

e, 1 mil.

TINCTURA SCILLÆ—Tincture of Squill—**Tr. Scill.**

If biologically assayed, the M. L. D. should not be greater than 0.006 mil of tincture per gramme body weight of frog.

Prepared by moistening 10 gm. squill in No. 20 powder with sufficient menstruum, A. 3 volumes and W. 1 volume, and macerating it in a closed vessel in a moderately warm place for twenty-four hours, stirring occasionally; then transferring it to a percolator, shaking it down evenly without packing, and pouring on enough of the menstruum to saturate the powder and leave a stratum above it; closing the lower orifice when the liquid begins to drop, closely covering the percolator, and macerating for twenty-four hours; then proceeding slowly with the percolation, gradually adding sufficient of the same menstruum to make 100 mils.

Expectorant, diuretic. Dose 1 mil.

TINCTURA STRAMONII—Tincture of Stramonium—**Tr. Stramon.**

Contains 0.0225 to 0.0275 g/m t. a.

Prepared by percolating 10 gm. stramonium in No. 60 powder with sufficient diluted alcohol to make about 100 mils.

Anodyne, antispasmodic. Dose, 0.5 mil.

TINCTURA STROPHANTHI—Tincture of Strophanthus—**Tr. Strophanth.**

If biologically assayed, the M. L. D. should not be greater than 0.00006 mil of tincture per gramme body weight of frog.

Prepared by packing 10 gm. of strophanthus in No. 40 powder in a cylindric percolator and slowly percolating it with purified petroleum benzin until a few drops of the percolate, evaporated upon a filter paper, no longer leave a greasy stain; then removing the strophanthus from the percolator and exposing it to air until it is dry and the odor of benzin has disappeared; then percolating it with sufficient alcohol, after having macerated it for forty-eight hours, to make 100 mils.

Heart stimulant. Dose, 0.5 mil.

TINCTURA TOLUTANA—Tincture of Tolu—**Tr. Tolu.**

Prepared by macerating 20 gm. balsam of tolu with sufficient alcohol to make 100 mils.

An ingredient in syrup of tolu, 5 m/m.

Expectorant, flavoring. Dose, 2 mils.

TINCTURA VALERIANÆ—Tincture of Valerian—**Tr. Valer.**

Prepared by percolating 20 gm. valerian in No. 40 powder with sufficient menstruum, A. 3 volumes and W. 1 volume, to make 100 mils.

Antispasmodic. Dose, 4 mils.

TINCTURA VALERIANÆ AMMONIATA—Ammoniated Tincture of Valerian—**Tr. Valer. Ammon.**

Prepared by percolating 20 gm. valerian in No. 40 powder with sufficient aromatic spirit of ammonia to make 100 mils.

Antispasmodic. Dose, 2 mils.

TINCTURA VERATRI VIRIDIS—Tincture of Veratrum Viride—**Tr. Verat. Vir.**

Prepared by percolating 10 gm. veratrum viride in No. 60 powder with sufficient alcohol to make 100 mils.

Circulatory depressant. Dose, 0.5 mil.

TINCTURA ZINGIBERIS—Tincture of Ginger—**Tr. Zingib.**—*Tincture of Jamaica Ginger*

Prepared by percolating Jamaica ginger in No. 30 powder with sufficient alcohol to make 100 mils.

An ingredient in aromatic sulphuric acid, 5 m/m.

Stomachic, carminative, flavoring. Dose, 2 mils.

TRITURATIONES—TRITURATIONS

Origin.—L. *tritura*, a rubbing.

Pharmacopœial, 1; U. S. P. VIII, 1; N. F., none.

Definition.—Triturations are finely [illegible] stances made by triturating together [illegible] 90 parts of sugar of milk.

Method of Preparation.—They are prepared by trituration. The U. S. P. gives the following general formula for their preparation:

"Take of

The substance,	10 gm.
Sugar of milk, in moderately fine powder,	90 gm.
To make	100 gm.

"Weigh the substance and the sugar of milk separately; then place the substance, previously reduced, if necessary, to a moderately fine powder, in a mortar; add about an equal measure of sugar of milk, mix well by means of a spatula, and triturate the powders thoroughly together. Then add fresh portions of the sugar of milk from time to time until the whole is added, and continue the trituration after each addition until the substance is intimately mixed with the sugar of milk and reduced to a fine powder."

Advantage of Class.—They offer a means of administering solid medicinal substances in definite and uniform strength and in a form permitting of ready absorption.

Incompatibilities.—They are not prescribed in combination.

Preservation.—They should be preserved in wide-mouth, tightly stoppered bottles, in a cool, dark place.

Administration.—They are usually administered as powders, but may be administered in capsules, cachets, or in the form of tablet triturates.

TRITURATIO ELATERINI—Trituration of Elaterin—Trit. Elaterin.

Prepared by triturating together 10 gm. elaterin and 90 gm. sugar of milk in moderately fine powder.

Hydragogue cathartic. Dose, 30 mg.

TROCHISCI—TROCHES

Origin.—Gr. *trochiskos*, a small wheel.

Pharmacopœial, 5; U. S. P. VIII, 9; N. F., 9.

Definition.—They are flat solid bodies, intended to be dissolved in the mouth for their local effect on the membrane of the mouth and throat, and are composed of medicinal ingredients mixed into a paste with sugar and mucilage and dried.

Method of Preparation.—In small quantities they are best prepared by mixing the ingredients in a mortar to a soft mass; then rolling on the pill tile into a "pipe" of the proper length, dividing into the required number of parts, rolling each part quickly into a ball between the thumb and fingers, and then flattening it on the pill tile with the spatula. A little dusting-powder or powdered sugar may be sparingly used if necessary to prevent the troches from sticking to the apparatus.

For larger quantities the mass is best rolled into a thin sheet of the proper thickness and the troches stamped out with a lozenge cutter.

Lozenge.—Originally a hard, diamond-shaped mass of medicinal substance. The term is now extended to include other convenient shaped masses, such as round, oval, lenticular, etc. They are prepared similarly to troches.

Advantage of Class.—They present the medicinal ingredients in a form suitable for prolonged application to the mucous membrane of the mouth and throat.

Incompatibilities.—They are in dose form and administered alone, so would have no incompatibilities.

Preservation.—If thoroughly dried they may be kept in glass containers, otherwise cartons are preferable.

Administration.—They are allowed to dissolve slowly in the mouth one at a time.

TROCHISCI ACIDI TANNICI—Troches of Tannic Acid—Troch. Acid. Tann.

Prepared by rubbing together 6 gm. tannic acid, 65 gm. powdered sugar, 2 gm. finely powdered tragacanth until they are thoroughly mixed; then forming a mass with stronger orange flower water and dividing into 100 troches.

Astringent.

TROCHISCI AMMONII CHLORIDI—Troches of Ammonium Chloride—Troch. Ammon. Chlor.

Prepared by rubbing together 10 gm. ammo [illegible]
20 gm. extract of glycyrrhiza, 2 gm. finely powde [illegible]

and 40 gm. powdered sugar until they are thoroughly mixed; then forming a mass with syrup of tolu and dividing into 100 troches.

Expectorant.

TROCHISCI CUBEBÆ—Troches of Cubeb—**Troch. Cubeb.**

Prepared by rubbing together 25 gm. extract of glycyrrhiza and 12 gm. finely powdered acacia until they are thoroughly mixed; then adding 2 gm. oleoresin of cubeb and 1 mil oil of sassafras and incorporating them with the mixture., lastly forming a mass with syrup of tolu and dividing into 100 troches.

Expectorant.

TROCHISCI POTASSII CHLORATIS—Troches of Potassium Chlorate—**Troch. Pot. Chlor.**

Prepared by mixing 60 gm. powdered sugar with 3 gm. finely powdered tragacanth by trituration in a mortar; then transferring the mixture to a sheet of paper, and by means of a bone or wooden spatula mixing it with 15 gm. potassium chlorate, being careful to avoid unnecessary trituration or pressure, which might cause the mixture to explode; lastly forming a mass with water and dividing into 100 troches.

Antiseptic.

TROCHISCI SODII BICARBONATIS—Troches of Sodium Bicarbonate—**Troch. Sod. Bicarb.**

Prepared by triturating 1 gm. freshly grated myristica with 54 gm. powdered sugar, gradually added, until they are reduced to a fine powder, then mixing intimately with 18 gm. sodium bicarbonate, and lastly forming a mass with mucilage of acacia and dividing into 100 troches.

Antacid.

UNGUENTA—OINTMENTS

Origin.—L. *ungere,* smear or anoint.

Pharmacopœial, 20; U. S. P. VIII, 24; N. F., 12.

Definition.—Ointments are fatty preparations of abo consistence of lard, to be applied externally, usually by ir

Method of Preparation.—Nineteen are prepared poration and one by incorporation and chemical reaction—ointment of mercuric nitrate.

Advantage of Class.—They are absorbed less rapidly than oleates, and hence are more soothing; and more rapidly than cerates. They therefore combine the systemic action of the oleate and the protective function of the cerate.

Incompatibilities.—Aside from the ointments that are intended for vehicles they are not generally prescribed in combination, and hence incompatibilities are infrequent.

Preservation.—They are best preserved in amber-colored or opal glass jars, in a cool place.

Administration.—They are administered by spreading on the skin; inunction favors absorption.

UNGUENTUM—Ointment—Ung.—*Simple Ointment*

Prepared by melting 20 gm. white wax and adding 80 gm. benzoinated lard, heating gently until liquefied, then stirring the mixture until it congeals.

In southern latitudes and during the warm season in other localities 5 gm. of the benzoinated lard (more if necessary) may be replaced by an equal quantity of white wax.

An ingredient in ointment of tannic acid, 60 per cent.; nutgall ointment, 80 per cent.; ointment of phenol, 97.75 per cent.

Emollient and vehicle.

UNGUENTUM ACIDI BORICI—Ointment of Boric Acid—Ung. Acid. Bor.

Prepared by melting 5 gm. paraffin, adding to it 85 gm. white petrolatum, gently heating until liquefied, then gradually adding the hot liquid to 10 gm. boric acid, contained in a warm mortar, triturating thoroughly, and stirring until cold.

Antiseptic.

UNGUENTUM ACIDI TANNICI—Ointment of Tannic Acid—Ung. Acid. Tann.

Prepared by dissolving 20 gm. tannic acid in 20 gm. glycerin [illegible]tle heat and mixing the solution with 60 gm. [illegible]e of iron utensils.

UNGUENTUM AQUÆ ROSÆ—Ointment of Rose Water—**Ung. Aq. Ros.**

Ointment of rose water must be free from rancidity.

Prepared by melting 12.5 gm. spermaceti and 12 gm. white wax, both in small pieces, on a water-bath, then adding 56 gm. expressed oil of almonds, stirring and continuing the heating until the mixture is uniform, then mixing it with a solution of 0.5 gm. borax in 19 gm. stronger rose water warmed to the same temperature, and stirring rapidly and continuously until it congeals and becomes of uniform consistence.

If the ointment has become chilled, warm it slightly before attempting to incorporate other ingredients with it. The borax is used to give a whiter and more creamy preparation.

Emollient, vehicle.

UNGUENTUM BELLADONNÆ—Belladonna Ointment—**Ung. Bellad.**

Prepared by triturating 10 gm. pilular extract of belladonna with 5 mils diluted alcohol to a smooth mixture, then incorporating with it 30 gm. hydrous wool fat and 55 gm. benzoinated lard.

Anodyne.

UNGUENTUM CHRYSAROBINI—Chrysarobin Ointment—**Ung. Chrysarobin.**

Prepared by triturating 6 gm. chrysarobin with 94 gm. melted benzoinated lard, heating the mixture twenty minutes on a water-bath with occasional stirring, then straining and stirring until it congeals.

Parasiticide.

UNGUENTUM DIACHYLON—Diachylon Ointment—**Ung. Diachyl.**

Prepared by melting 50 gm. lead plaster and 49 gm. white petrolatum at a gentle heat, straining the mixture, allowir to cool but not congeal, adding 1 gm. oil of lavender, and ring until it is cold.

Antiseptic, healing.

UNGUENTUM GALLÆ—Nutgall Ointment—Ung. Gall.

Prepared by rubbing 20 gm. nutgall in very fine powder with 80 gm. ointment gradually added, until they are thoroughly mixed. Avoid the use of metallic utensils to prevent discoloration.

Astringent.

UNGUENTUM HYDRARGYRI—Mercurial Ointment—Ung. Hydrarg.

Contains 4.9 to 5.1 per cent. mercury, Hg (200.6).

Prepared by triturating 2 gm. oleate of mercury in a warmed mortar with 50 gm. mercury, gradually added, until the globules are completely divided, and setting it aside for fifteen minutes; then adding about 2.5 gm. of a partially cooled mixture of 23 gm. prepared suet and 25 gm. benzoinated lard, continuing the triturating until the globules of the mercury are no longer visible under a lens magnifying 10 diameters; then adding the remainder of the lard, suet mixture, and mixing thoroughly.

Alterative, resolvent, parasiticide.

UNGUENTUM HYDRARGYRI AMMONIATI—Ointment of Ammoniated Mercury—Ung. Hydrarg. Ammon.—*White Precipitate Ointment*

Prepared by rubbing 10 gm. ammoniated mercury with an equal weight of melted white petrolatum, then adding 40 gm. more of melted white petrolatum and 40 gm. hydrous wool fat, mixing thoroughly, and stirring the mixture until it congeals.

Parasiticide.

UNGUENTUM HYDRARGYRI DILUTUM—Diluted Mercurial Ointment—Ung. Hydrarg. Dil.—*Blue Ointment*

Contains 2.9 to 3.1 per cent. mercury, Hg (200.6).

Prepared by thoroughly mixing 60 gm. mercurial ointment with 40 gm. petrolatum. In southern latitudes and during the warm season in other localities 5 gm. of the petrolatum (more if necessary) may be replaced with an equal quantity of yellow wax.

Alterative, parasiticide.

UNGUENTUM HYDRARGYRI NITRATIS—Ointment of Mercuric Nitrate—**Ung. Hydrarg. Nit.**—*Citrine Ointment*

Prepared by adding 7 gm. nitric acid to 76 gm. melted lard and heating at 45° C. until the characteristic reaction is complete (an inverted funnel should be held over the reacting substances to protect the operator from spurting lard); withdrawing the heat immediately after the rapid rise of froth which accompanies the end of the reaction, and cooling the treated lard, stirring until it assumes a bright citrine color; then adding the mercuric nitrate, prepared by dissolving 7 gm. mercury in 10.5 gm. nitric acid, warming if necessary, and mixing thoroughly. All contact with metallic utensils or containers must be avoided.

Chemical Reaction: The result of the action of the nitric acid on the lard is to convert the olein into a solid isomeric substance, elaidin. The action between the mercury and nitric acid is represented thus:

$$3Hg + 8HNO_3 = 3Hg(NO_3)_2 + 2NO + 4H_2O$$

Stimulating alterative.

UNGUENTUM HYDRARGYRI OXIDI FLAVI—Ointment of Yellow Mercuric Oxide—**Ung. Hydrarg. Oxid. Flav.**

Prepared by triturating 10 gm. yellow mercuric oxide with 10 gm. water until the mixture is perfectly smooth, then adding it to 40 gm. hydrous wool fat in divided portions, and then incorporating it thoroughly with 40 gm. petrolatum. All contact with metallic utensils or containers must be avoided.

Alterative in skin diseases.

UNGUENTUM IODI—Iodine Ointment—**Ung. Iodi**

Must not be dispensed unless it has been recently prepared.

Prepared by triturating 4 gm. each iodine and potassium iodide in a glass mortar with 12 gm. glycerine until di then gradually incorporating 80 gm. benzoinated lard.

Alterative, resolvent.

UNGUENTUM IODOFORMI — Iodoform Ointment — Ung. Iodof.

Prepared by triturating 10 gm. iodoform with about twice its weight of benzoinated lard, then incorporating sufficient benzoinated lard to make 100 gm.

Antiseptic.

UNGUENTUM PHENOLIS — Ointment of Phenol — Ung. Phenol.—*Ointment of Carbolic Acid*

Prepared by mixing 2.25 gm. liquefied phenol with 97.75 gm. melted ointment and stirring the mixture until it begins to congeal.

Antiseptic.

UNGUENTUM PICIS LIQUIDÆ—Tar Ointment—Ung. Pic. Liq.

Prepared by thoroughly mixing together a melted mixture of 15 gm. yellow wax, 35 gm. lard, and 50 gm. warmed tar, straining through muslin and stirring until it congeals.

Stimulating antiseptic.

UNGUENTUM STRAMONII—Stramonium Ointment—Ung. Stramon.

Prepared by triturating 10 gm. pilular extract of stramonium with 5 mils diluted alcohol to a smooth mixture, incorporating with this 20 gm. hydrous wool fat, and then 65 gm. benzoinated lard.

Anodyne.

UNGUENTUM SULPHURIS — Sulphur Ointment — Ung. Sulphur.

Prepared by thoroughly incorporating 15 gm. sublimed sulphur with 85 gm. benzoinated lard, gradually added.

Antiparasitic.

UNGUENTUM ZINCI OXIDI—Ointment of Zinc Oxide—Ung. Zinc. Ox.—*Zinc Ointment*

Prepared by rubbing 20 gm. zinc oxide in very fine powder with about an equal weight of melted benzoinated lard in a previously warmed container, and with this incorporating sufficient benzoinated lard, previously melted, to make 100 gm.; if necessary straining the ointment while warm, and stirring it thoroughly until it congeals.

Mild astringent.

VINA, N. F.—WINES

Origin.—L. *vinum*, wine.

Pharmacopœial, none; U. S. P. VIII, 10; N. F., 16.

Definition.—The wines may be divided into two classes, Simple and Medicated. The medicated wines are solutions of medicinal substances in wine. White Wine (sherry wine) is usually used as the solvent or menstruum. They differ from tinctures only in having wine instead of alcohol as the solvent.

Methods of Preparation.—The simple wines are made by fermenting the juice of the grape. Red Wines result from the fermentation of the juice of dark colored grapes (red grapes) in the presence of their skins, and subjected to the usual cellar-treatment for fining and aging. White Wines result from the fermentation of the juice of light colored grapes (white grapes), freed from stems, seeds, and skins, and subjected to the usual cellar-treatment for fining and aging. Medicated Wines are prepared by solution or dilution, percolation, and combined maceration and percolation, using sherry wine or sherry wine fortified with alcohol.

Advantage of Class.—They are considered as being more agreeable to the taste than tinctures.

Incompatibilities.—Same as those of the tinctures.

Preservation.—Simple wines should be preserved in well-filled casks or in bottles. Medicated wines should be preserved in closely stoppered bottles, in a cool place, protected from light.

Administration.—Similar to that of tinctures.

SYNOPSIS OF WINES

Name.	Ingredients.		Process.	Uses and dose.
VINUM ANTIMONII, N. F.—**Vin. Antimon.**—Wine of Antimony, replacing U. S. P. VIII.	Ant. and Pot. Tart.,	0.4 gm.	Solution.	Expectorant. Emetic, 1 mil.
	Boil. Dist. Water,	2.5 mils.		
	Sherry Wine, q. s.,	100.0 mils.		
VINUM AURANTII COMPOSITUM, N. F.—**Vin. Aurant. Co.**—Compound Wine of Orange—*Compound Elixir of Orange.*	Bitter Orange Peel,	20.0 gm.	Percolation.	Stomachic. Tonic, 4 mils.
	Absinthium,	6.5 gm.		
	Menyanthes,	6.5 gm.		
	Cascarilla,	6.5 gm.		
	Saigon Cinnam.,	4.3 gm.		
	Gentian,	4.3 gm.		
	(All in No. 40 powder)			
	Pot. Carbonate,	1.0 gm.		
	Sherry Wine, q. s.,	100.0 mils.		
VINUM CARNIS, N. F.—**Vin. Carn.**—Wine of Beef—*Beef and Wine.*	Ext. of Beef,	3.0 gm.	Solution.	Appetizer. Stimulant, 8 mils.
	Hot Water,	6.0 mils.		
	Syrup,	10.0 mils.		
	Alcohol,	5.0 mils.		
	Co. Sp. Orange,	0.1 mil.		
	Sherry Wine, q. s.,	100.0 mils.		
VINUM CARNIS ET FERRI, N. F.—**Vin. Carn. et Ferr.**—Wine [illegible] and Iron—*Beef, Wine,*	Extract of Beef,	3.0 gm.	Solution.	Tonic, 8 mils.
	Hot Water,	6.0 mils.		
	Iron and Ammon. Citrate,	1.0 gm.		
	Syrup,	10.0 mils.		
	Alcohol,	5.0 mils.		
	Co. Sp. Orange,	0.1 mil.		
	Ammonia Water,			
	Sherry Wine, q. s.,	100.0 mils.		

Name.	Ingredients.		Process.	Uses and dose.
VINUM COLCHICI CORMI, N. F.—Vin. Colchic. Corm.—Wine of Colchicum Corm.	Colchic. Corm. No. 30, Alcohol, Sherry Wine, q. s.,	40.0 gm. 15.0 mils. 100.0 mils.	Percolation. Assaying. 0.126 to 0.154 g/m, a.	Alterative. Antirheumatic, 0.6 mil.
VINUM COLCHICI SEMINIS, N. F., U. S. P. VIII—Vin. Colch. Sem.—Wine of Colchicum Seed.	Fldext. Colchic. Seed, Alcohol, Sherry Wine, q. s.,	10.0 mils. 15.0 mils. 100.0 mils.	Solution. Assaying. 0.036 to 0.044 g/m, a.	Alterative. Antirheumatic, 2 mils.
VINUM FERRI, N. F., U. S. P. VIII—Vin. Ferr.—Wine of Iron —*Wine of Citrate of Iron.*	Iron and Ammon. Cit., Tr. Sweet Orange Peel, Syrup, Sherry Wine, q. s.,	4.0 gm. 6.0 mils. 10.0 mils. 100.0 mils.	Solution.	Ferruginous tonic, 8 mils.
VINUM FERRI AMARUM, N. F., U. S. P. VIII—Vin. Ferr. Amar.—Bitter Wine of Iron.	Iron and Quin. Cit., Tr. Sweet Orange Peel, Syrup, Sherry Wine, q. s.,	5.0 gm. 6.0 mils. 30.0 mils. 100.0 mils.	Solution.	Bitter. Ferruginous tonic, 8 mils.
VINUM FRAXINI, N. F.—Vin. Frax.—Wine of White Ash.	White Ash Bark, No. 40, Alcohol and Sherry Wine, 125 : 875, q. s.,	50.0 gm. 100.0 mils.	Maceration. Percolation.	Antiperiodic. Bitter tonic, 4 mils.
VINUM IPECACUANHÆ, N. F., U. S. P. VIII—Vin. Ipecac.—Wine of Ipecac.	Fldext. Ipecac, Alcohol, Sherry Wine, q. s.,	10.0 mils. 10.0 mils. 100.0 mils.	Solution. Assaying. 0.18 to 0.22 g/m, t. a.	Expectorant. Diaphoretic, 1 mil.

VINUM PEPSINI, N. F.—Vin. Pepsin.—Wine of Pepsin—*Pepsin Wine.*	Glycerite of Pepsin, Alcohol, Sherry Wine,	20.0 mils. 10.0 mils. 70.0 mils.	Solution.	Digestant, 8 mils.
VINUM PICIS, N. F.—Vin. Pic. —Wine of Tar.	Tar, Water, Pumice, No. 40, Alcohol and Sherry Wine, 125 : 875, q. s.,	10.0 gm. 25.0 mils. 12.5 gm. 100.0 mils.	Solution.	Expectorant, 8 mils.
VINUM PRUNI VIRGINIANÆ, N. F.—Vin. Prun. Virg.—Wine of Wild Cherry.	Wild Cherry, No. 40, Water, Alcohol, Sugar, Purif. Talc., Sherry Wine, q. s.,	25.0 gm. 20.0 mils. 10.0 mils. 16.5 gm. 1.5 gm. 100.0 mils.	Percolation. Solution. Filtration.	Tonic, 4 mils.
VINUM PRUNI VIRGINIANÆ FERRATUM, N. F.—Vin. Prun. Virg. Ferr.—Ferrated Wine of Wild Cherry.	Tr. Ferr. Citro-Chlor., Wine of Wild Cherry, q. s.,	8.0 mils. 100.0 mils.	Solution.	Tonic, 4 mils.
M RHEI COMPOSITUM, F.—Vin. Rhei Co.—Com- Wine of Rhubarb—*Tr. vosa,* N. F. III.	Fldext. Rhubarb, Fldext. Bitter Orange Peel, Tr. Cardamom, Sugar, Sherry Wine, q. s.,	8.0 mils. 2.0 mils. 8.0 mils. 12.5 gm. 100.0 mils.	Solution.	4 mils.
CUM, N. F.—Vin. y Wine.	Made from grape juice freed from seeds, stems, skins, and fortified with pure grape brandy. Contains 16 to 24 m/m of C_2H_5OH.		Fer mentation.	Tonic. Stimulant. Vehicle.

UNOFFICIAL MEDICINAL PREPARATIONS

DEFINITIONS

ABSTRACTA, U. S. P. VI—Abstracts.—A class of preparations, 11 in number, introduced into the U. S. P. of 1880. They did not become popular and have been omitted from the subsequent revisions.

An abstract is a solid, powdered preparation of definite strength, each gramme representing the soluble constituents of 2 gm. of the drug.

They were prepared by evaporating percolates to dryness and standardizing by the addition of milk-sugar.

ACERIDE.—A kind of plaster, formerly in use, made without wax.

AMPULLÆ—Ampoules or Ampules.—Small glass containers having capillary necks, to be closed by fusion, holding one dose of sterilized medicine for hypodermic administration.

BACILLULÆ—Bacills.—A bacill is a troche, short and rodlike in form.

BALNEUM—Bath.—*Definition.*—The medium in which the body is wholly or partly immersed. Applied also to a lotion, species, or any preparation which is intended to be added to this medium.

For a full immersion for an adult about 1 kg. of species are required. The decoction made from these is to be added to the water in the tub and the whole brought to the proper temperature.

Baths may be either non-medicated or medicated.

The cold bath should be about 20° C. and is usually non-medicated.

The tepid bath or lukewarm bath should be from 25° C. to 35° C.

The warm bath and the hot bath range from 35° to 41° C.

CAPSULÆ—Capsules.—They may be either empty or filled.

Empty capsules are small cases or envelopes of soluble material used for enclosing medicines, usually nauseous medicines, which are to be swallowed.

Several kinds are recognized: Hard capsules, soft cap and starch capsules.

Hard capsules are made of gelatin and consist of two short cylindric telescoping shells. They are intended for the administration of solid and pasty substances. They are made in various sizes, which are designated by number. The larger the number, the smaller the capsule. A No. 3 capsule holds about 2 grains of quinine sulphate.

Soft capsules are ovoid and made in one piece. They are intended for the administration of liquids. These capsules are made from gelatin to which sufficient glycerin has been added to make them soft and elastic. They are especially adapted to the administration of oily liquids—fixed or volatile oils. When aqueous liquids are to be administered in capsules they are best massed with some absorbent powder, like powdered althæa and starch, and dispensed in hard capsules. Soft capsules range in size from 0.6 mil to 15 mils.

CAPSULÆ AMYLACEÆ—Starch Capsules—Cachets (kashā′), Konseals.—They are small concave-convex disks (saucer shaped), composed of the same material as wafers (see Chartulæ Amylaceæ), used for enclosing medicines. The medicine is placed in one of the disks, the edge of the other is moistened, and the two disks cemented together by pressure. These were contrived by Karl Morstadt, of Prague, Austria, and were formerly known as Morstadt's Cachets. Their popularity is largely due to the efforts of Limousin, of Paris. In the United States they are generally known as "Konseals," a name adopted by J. M. Grosvenor, of Boston. This firm has also introduced an excellent apparatus for dispensing konseals which has added materially to their popularity.

Gelonida are enteric capsules containing various medicaments, manufactured by Goedicke & Co.

CATACLITUM—A Medicated Pillow.—*Example:* Cataclitum Humuli, hop pillow.

CHARTULÆ AMYLACEÆ—Wafers.—These are thin sheets of starchy material used for enclosing medicines for the purpose of masking the taste and prepared by baking a mixture of flour and water between two hot polished, metal surfaces. The sheets [illegible] inches square. The medicine is [illegible] sheet, which is supported by a spoon, the edges folded over, and the medicine and its envelope swallowed with a draft of water.

CLYSTER.—An enema. See below.

COLLUNARIA.—Nostril injections.

COLLUTARIA.—Mouth-washes, gargles.

COLLYRIA.—Eye-waters or eye-washes.

CONSERVA—Conserves.—Semisolid saccharine preparations made by compounding moist or recent drugs with sugar. Compare *Electuaria.*

DIALYSATA—Dialysates.—A class of liquid preparations prepared by dialysis. They may contain either the crystalloids or the colloids. *Example:* Dialyzed Iron (Colloid).

DRAGEES.—Large sugar-coated pills.

ELECTUARIA—Electuaries.—Semisolid saccharine preparations made by compounding dry powdered drugs with moist saccharine substances. Compare *Conserva.*

EMBROCATIONES—Embrocations.—Liquid or semiliquid preparations for external application, applied with friction—liniments.

ENEMATA—Enemas.—Liquid preparations which are intended to be injected into the rectum.

FOMENTA—Fomentations.—Infusions, decoctions, lotions or other medicinal liquids which are intended to be absorbed in thick woolen cloths and applied as hot as can be endured by the patient.

GUTTÆ—Drops.—Liquid preparations, usually stimulating or carminative in character, which are administered in small doses (in drops) and diluted when taken.

HAUSTI—Draughts.—Liquid preparations having very large doses, 60 to 360 mils. A draught is also called a "potus."

LAMEL.—A small medicated gelatin disk to be inserted between the eyelid and the eyeball.

LINCTI—Licks, Lohochs, or Loochs.—Thick, viscid medicinal substances usually having honey or syrup as a base, which are intended to be licked from a spoon.

MOXAS.—Small cones or rods of vegetable substances containing oxidizing agents which, when ignited, will burn without flame or fusing, giving out intense heat; used as a cautery.

ORBICULES.—Small hemispheric saccharine bodies which are intended to be medicated by saturating them with a solution of medicament in strong alcohol.

PASTILLÆ—Pastilles, Pastils.—A class of solid preparations having various shapes, though usually conical, which are intended to be burned for the purpose of fumigation. Such preparations are generally known as fumigating pastils (pastillæ fumales).

The term "pastil" is also applied to small medicated disks having glycerogelatin or chocolate as a base, and also to soft lozenges, having usually gelatin or chocolate for a base.

PESSARIA—Pessaries.—Instruments which are introduced into the vagina for the support of the uterus. The term is also applied to vaginal suppositories.

PIGMENTA—Pigments.—A class of highly active, local preparations which are intended to be painted on, *e. g.*, applied with a brush.

POMATA—Pomades.—Perfumed ointments which are used for cosmetic purposes.

RESINOIDS.—A class of eclectic preparations which are precipitates obtained by pouring concentrated alcoholic percolates into water.

STERULA.—A glass capsule (ampule) containing a sterile solution of a drug for hypodermic administration.

TONOL.—A collective brand name for the glycerophosphates made by Schering.

TRITOLES.—Emulsions of fixed oils with substances capable of effecting a more minute subdivision of the oil than is usually the case in the ordinary emulsion of fixed oil. Malt extract is largely used for effecting this subdivision. Emulsion of oil, 4 parts, and diastasic extract of malt, 1 part.

VAPORES—Vapors.—Liquids containing volatile medicines which are to be administered by inhaling their vapors. Generally this liquid is added to boiling water to facilitate the vaporization. Special apparatus is frequently required.

VISCETTE.—A compressed tablet of any effervescent salt.

CHAPTER V

INCOMPATIBILITY

Origin.—L. *in*, not + *compatible*, harmonious.

Definition (literal).—The inability to exist together harmoniously.

The modern view of incompatibility is the fact that the object of the prescriber is defeated in the resulting combination, this being different from what is intended.

When applied to pharmaceutic and medicinal articles it refers to a condition, such as a certain antagonism, existing between medicinal substances. For example, we should say that epsom salt (magnesium sulphate) and carbonate of sodium were incompatible substances, because when they are mixed together in solution they chemically decompose each other, the magnesium salt and the sodium salt forming two new compounds; one of these is insoluble (magnesium carbonate), the other soluble (sodium sulphate). The chemical change here produces, as stated, new compounds. Furthermore, these new compounds produced may alter the physiologic action of the mixture. Therefore, incompatibility may refer to a chemical change or decomposition in the medicinal substance or it may refer to a therapeutic antagonism of the constituents, or both.

For pharmaceutic consideration incompatibility is generally considered under four classes:

1. Chemic, which involves an interchange of radicals or elements between the various constituents of the preparation.

2. Physical, which involves a change in the physical state of one or more of the ingredients, such as precipitation, liquefaction, etc.

3. Pharmaceutic. When either a chemic or physical change takes place which, while not affecting the therapeutic action of the medicine, does render it unsightly or otherwise unsuitable for administration.

4. Therapeutic. When the actions of the various ingredients are physiologically antagonistic, one nullifying the action of the other. To detect a therapeutic incompatibility requires an extensive knowledge of the medicinal action of drugs because most drugs have several well-defined actions, and to play these successfully one against the other or blend them constitutes one of the sciences of prescribing.

There is a prevailing impression that an incompatible mixture is harmful or dangerous, but such is not always the case, and, therefore, we should be obliged to make a distinction between different forms of incompatibility as follows:

1. Harmless or Innocent.
    - (*a*) Incompatibility anticipated and intended by prescriber.

      In this class are those mixtures, for example, where the prescriber desires a mixture in the making of which there is a chemical decomposition and the resulting products of the chemical reaction are intended, as in the following prescription:

Zinc Sulphate	gr. xv
Lead Acetate	gr. xv
Distilled Water, up to	f℥iv

      Use as injection.

      A chemical decomposition here occurs, resulting in a precipitate of lead sulphate and a solution of zinc acetate. The prescriber expects the mixture to be shaken before using and desires the presence of the precipitate—which should not be filtered out as some dispensers have erroneously supposed.
    - (*b*) Incompatibility not intended, not anticipated by prescriber.

      As an illustration of this harmless incompatible mixture we may cite the following:

Fluidextract Buchu	f℥ss
Spirit Nitrous Ether	f℥iss
Potassium Acetate	f℥ij
Syrup and Cinnamon Water, each sufficient to make	f℥iv

      The prescriber may have been aware of the incompatibility of this mixture and may possibly have intended the resulting mixture. Nevertheless, we are inclined to condemn it as unpharmaceutic for the reason that an ill-defined chemical reaction occurs between the nitrous ether and the buchu. [illegible]
      nitrous gas and precipitating resinous matter. If [illegible]
      be dispensed, the gas should be allowed to [illegible]
      before the bottle containing the mixture is [illegible]
      Numerous examples of harmless incompa[illegible]
      cited and many of these it is quite [illegible]
      An interesting prescription from [illegible]

compatibilities it presents (being about as many as there are ingredients) is as follows:*

Tincturæ Ferri Chloridi	fʒiss
Sodii Hyposulphitis	fʒiss
Potassii Chloratis	fʒiij
Quininæ Sulphatis	gr. xv
Aquæ	f℥ij

A curious series of reactions take place, and when the mixture is complete it contains besides ferric chloride, ferric oxychloride, precipitated sulphur, sodium sulphate, sodium chloride, potassium sulphate, potassium chloride, potassium chlorate, and quinine chlorate. Doubtless the physician did not intend to administer these latter ingredients to his patients, though no harm would arise from their administration.

A dispenser should not decline to compound an innocent and harmless incompatible mixture when it is evident that the prescription is intended by the prescriber.

(*c*) Incompatibility resulting in the destruction of a medicinal ingredient, rendering it inert. Example:

Tinct. Ferri Chloridi	fʒij
Tinct. Gentianæ Comp.	fʒss
Sodii Carbonatis	fʒj
Aquæ Menthæ Pip., q. s.	f℥iij

The alkalinity of the sodium salt precipitates the iron in the form of an insoluble hydrate, which latter is practically inert.

2. Harmful.

(*a*) Incompatibility in which a poisonous ingredient is precipitated.

Quininæ Sulphatis	3 gm.
Acidi Sulphurici Aromat.	5 c.c.
Liquoris Arseni et Hydrargyri Iodidi	10 c.c.
Potassii Iodidi	5 gm.
Aquæ Cinnamomi	60 c.c.
Syrupi	100 c.c.

M. Sig. Dessertspoonful after meals.

This prescription has been dispensed with "shake the vial" on label, but the druggist should advise the doctor. It is not safe to dispense for the reason that the mercuric salt is precipitated with the quinine, and on standing free iodine is liberated. A precipitated solution, when the precipitate contains poison, should never be dispensed for internal use, as an overdose is possible at any time in careless hands.

Many serious cases of this kind of incompatibility have occurred, one, for example, in which a solution of strychnine sulphate was compounded with sodium bicarbonate. The solution, at first only slightly cloudy, became wholly precipitated in a few days. The strychnine precipitated was given in the last dose, killing the patient. No "shake label" was on bo

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* Phar. Record, 1891, p. 398.

(*b*) Incompatibility resulting in formation of a dangerous immiscible liquid.

Potassium Bromide	ʒiv
Potassium Carbonate	ʒss
Chloral Hydrate	ʒv
Elixir of Cal.	fʒiv

In this mixture there appears a dangerous incompatibility due to the formation of a new chloral compound known as chloral alcoholate. This will float on the liquid as a more or less colorless stratum. While the chloral alcoholate is said to be non-poisonous, we would suggest that its presence is dangerous, inasmuch as it is exceedingly irritating. Markoe (Pharm. Record, 1885, page 237) states that chloral hydrate should never be dispensed with any preparation containing alcohol, potassium bromide, sodium bromide, etc., especially if these are made alkaline. An overdose is liable to be given from the fact that chloral alcoholate is contained in the superficial layer of the liquid. Even a "shake label" will not insure against accidents.

(*c*) Incompatibility in formation of a dangerous colored compound.

Antipyrine	ʒij
Spt. Nit. Eth.	fʒiv
Syrup up to	f℥iv

The green color produced is due to the formation of isonitroso-antipyrine.

Recent experiments seem to have shown that this new compound is not poisonous, yet the preparation should not be dispensed.

(*d*) Incompatibility from poisonous gas, etc.

Sodii Nitritis	ʒss
Syr. Acidi Hydriodici	f℥j
Elix. Lactopeptini	fʒij
Aquæ	f℥vj

Nitrous acid is liberated, which breaks down finally into water and a deep red gas of poisonous properties. At the same time iodine is liberated from the hydriodic acid by the action of the nitrogen oxide.

In avoiding incompatible combinations a knowledge is essential of:

1. The solvent powers of the different liquids to be used as solvents or vehicles. See Solvents Generally Used in Pharmaceutic Operations, page 76.
2. The relative solubilities of the different drugs in these liquids and the danger of change resulting from chemical reaction.

In using the following synopsis for this latter it is only needful to remember the well-known chemical law that if a solution of a compound be brought in contact with a solution of another compound and by an interchange of radicals an insoluble compound can be produced, that compound will be precipitated.

3. The therapeutic actions of the many drugs, especially those possessing important antagonistic actions. Consult List of Poisons and Antidotes, page 459.

SYNOPSIS OF SOLUBILITIES

Acetates are soluble.

Arsenates are insoluble, except those of the alkali metals.

Arsenites are insoluble, except those of the alkali metals.

Bromides are soluble, except mercurous and silver.

Carbonates are insoluble, except those of the alkali metals.

Chlorides are soluble, except those of lead (s.),* mercurous, and silver. *Antimony and bismuth chlorides are decomposed by water to form oxysalts.*

Citrates are soluble, except those of manganese, mercurous, silver and strontium, aluminium (s.), barium (s.), bismuth (s.), cadmium (s.), calcium (s.), lead (s.), zinc (s.).

Cyanides are insoluble, except mercuric and those of the alkali, metals, and the alkaline earths.

Hydrates are insoluble, except those of lead (s.), the alkali, metals, and the alkaline earths (s.).

Iodides are soluble, except those of antimony, bismuth, gold, lead (s.), mercuric, mercurous, platinum (s.), and silver.

Nitrates are soluble.

Oxalates are insoluble, except those of antimony (s.), chromium, ferrous (s.), stannic, and the alkali metals.

Oxides are insoluble, except those of barium, strontium, calcium (s.), and the alkaline metals.

Phosphates (ortho-) are insoluble, except those of the alkali metals.

Sulphates are soluble, except those of barium, strontium, calcium (s.), antimony, lead (s.), mercurous (s.), and silver (s.).

Sulphides are insoluble, except those of barium, calcium, strontium, and the alkali metals.

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* Sparingly soluble (s.).

Sulphites are soluble, except those of aluminum, antimony, barium, bismuth, calcium (s.), cobalt (s.), copper, ferrous (s.), lead, manganese (s.), nickel (s.), silver, stannous, strontium, and zinc (s.).

Tartrates are soluble, except those of antimony, barium, bismuth, cadmium (s.), calcium (s.), copper (s.), ferrous (s.), lead, manganese (s.), mercuric, mercurous, nickel (s.), silver, strontium (s.), and zinc (s.).

SYNOPSIS OF INCOMPATIBLE SUBSTANCES

Acids decompose hydrates, carbonates, and acid carbonates to form salts.

Alkaline hydrates, *carbonates,* and *acid carbonates* neutralize free acids, decompose some glucosides, and precipitate all alkaloids, some of which precipitates are soluble in excess of the precipitant, or in alcohol, if that liquid be present in sufficient amount to dissolve them.

Bromides precipitate morphine and strychnine salts on standing, but a few drops of dilute hydrochloric acid added, after the addition of the alkaloid, prevents the change.

Fixed and volatile oils and oleoresins with aqueous solutions, *when for internal use,* should always be emulsified, whether ordered so or not, and, to better emulsify the volatile oils, they should have mixed with them, prior to emulsification, an equal volume of olive, almond, or cottonseed oil.

Free acids *separate insoluble carminic acid* from compound tincture of cardamom and *precipitate glycyrrhizin* from fluidextract of licorice.

Glucosides are decomposed by free acids and precipitated by tannin; *tannic and gallic acids* precipitate alkaloids, albumen, gelatin, and the majority of metallic salts, and yield inks with iron solutions.

Infusions of gentian and infusions in general are incompatible with metallic salts.

Iodine and the iodides yield precipitates with the alkaloids.

Mercuric chloride is decomposed by solution of potassium arsenite, but, if the solution of potassium arsenite has first added to it, in slight excess, diluted hydrochloric acid, no precipitation will take place on the addition of the mercurial salt.

Mercuric chloride with acidulated solutions of alkaloids *forms crystalline double salts.*

Oxidizing agents, such as *nitric, nitrohydrochloric, picric,* and *chromic acids,* and *potassium bichromate* and *permanganate,* with *readily oxidizable substances,* such as *carbohydrates, alcohols, sulphur, phosphorus, sulphides,* and *organic matter* in general, form explosive compounds.

Potassium iodide in acid solution, or syrup of ferrous iodide, with **potassium chlorate** form a poisonous iodate.

Potassium-mercuric iodide precipitates alkaloidal solutions.

Potassium permanganate, if ordered in pill form, can best be made with cacao butter and petrolatum in very small quantity, and enclosed in gelatin capsules.

Pyrophosphate and phosphate of iron solutions precipitate with phosphoric acid.

The National Formulary recommends the use of dilute metaphosphoric acid in place of the official "ortho" variety, as yielding a permanently clear solution.

Resinous tinctures and fluidextracts, *prescribed with aqueous solutions,* should always be emulsified with acacia; *tinctures and fluidextracts made with stronger alcohol, when mixed with those made with diluted alcohol,* become turbid and precipitate, since the special solvent power of alcohol or of water for a substance diminishes in proportion to the quantity of the other liquid present. A "shake label" should always be used.

Silver nitrate is reduced by organic matter to oxide, with the exception, it is said, of opium and extract of hyoscyamus. A very good way of making pills of it is with cacao butter and petrolatum, etc., as mentioned above under Potassium Permanganate.

Sodium benzoate solution is decomposed by acids to yield the sparingly soluble benzoic acid.

Sodium borate precipitates morphine and cocaine salts, but the addition of a small quantity of boric acid prevents the precipitation.

Sodium salicylate in solution precipitates the sparingly soluble salicylic acid if mixed with acids, and yields, if dispensed in powders with potassium acetate, the very deliquescent potassium salicylate. *Sodium salicylate in strong solution* is decomposed by tincture of ferric chloride, but if well diluted first changes only into ferric salicylate.

Solutions of quinine salts, *with those of the alkaline acetates, or with Basham's mixture,* precipitate the sparingly soluble quinine acetate. *Morphine solutions* give the phenol reaction if mixed with tincture of ferric chloride.

Spirit of nitrous ether liberates iodine from solutions of iodides, and *decomposes antipyrine solutions,* forming a green nitro-derivative. It precipitates mucilage of acacia, but if it be well diluted with water it can usually be added last in a prescription without precipitating. Tannin preparations decompose it. *Tincture of guaiac* is stated by Potter to be pharmaceutically incompatible with it, although they are often prescribed together.

Stronger acids (mainly inorganic) set free the weaker acids (mainly organic) or, brought in contact with alcohol or alcoholic solutions, they form ethers.

Tincture of ferric chloride gelatinizes mucilage of acacia.

CHAPTER VI

TOXICOLOGY

TOXICOLOGY is the science which treats of poisons, their recognition, effects, and antidotes.

Poison.—Any substance which, in relatively small quantities, can injure the health or destroy life.

Poisonous action may be either local or remote.

The local action consists in the destruction of tissues at the point of contact.

Remote action is due to the poison being absorbed and taken into the circulation. It may reach the circulation by way of the mouth, lungs, rectum, or vagina, by absorption through the skin or exposed mucous membranes, or it may be introduced underneath the skin and directly into the circulation, hypodermically, by bites and stings of poisonous creatures, or through wounds.

The local effects consist mainly of two kinds: corrosion and irritation.

Corrosion, or the destruction of tissues, is caused by such agents as strong acids, alkalies, etc. See *Corrosives*.

Irritation is produced by diluted corrosives and by specific drugs, and varies from simple redness to ulceration and gangrene. See *Irritants*.

The remote action of poisons affects the nervous system, frequently producing very pronounced and characteristic symptoms. Thus, certain of them, like physostigma, produce marked contraction of the pupil of the eye (myosis), while others, like the solanaceous alkaloids, atropine, etc., produce a marked dilation of the pupil of the eye (mydriasis). Aconite produces a characteristic tingling sensation at the back of the mouth. Strychnine produces a characteristic stimulation of the spinal muscles, bending the person backward (opisthotonos), etc.

According to the most characteristic and prominent symptoms, poisons may be divided into three general classes:

1. Poisons which act very rapidly. Acids, hydrocyanic and oxalic; bromine; carbon dioxide; carbon monoxide; chlorine; cyanides; nicotine, strychnine, and strong mineral acids.

2. Poisons known as corrosives and irritants:

(*a*) *Corrosives* cause local destruction of tissues, nausea and vomiting, and death usually by shock.

Acids, chromic, hydrochloric, nitric, nitrohydrochloric, sulphuric, etc.; ammonia-water, barium salts, caustic potash, caustic soda, concentrated lye, phenol, potassium chlorate, potassium nitrate, quicklime, etc.

(*b*) *Irritants* cause pain, nausea, vomiting, and purging.

Cantharides, carbolic acid, castor beans, chlorine and compounds of antimony, arsenic, bismuth, copper, chromium, iron, lead, tin, zinc, ptomaines, croton oil, gelsemium, iodine, mushrooms, phosphorus, savin, veratrum, etc.

3. Poisons affecting the nervous system.

(*a*) *Narcotics* produce insensibility as the chief symptom, frequently preceded by more or less cerebral excitement. Alcohol, chloral, chloroform, ether, opium, etc.

(*b*) *Deliriants* produce delirium as a prominent symptom. Belladonna, camphor, cannabis, cocaine, hyoscyamus, mushrooms, solanine, stramonium, etc.

(*c*) *Convulsives.*—While convulsions may be produced by many poisons, the following produce very violent muscular paroxysms: Brucine, ignatia, narcotine, nux vomica, picrotoxin, strychnine, etc.

(*d*) *Multiple Disturbers.*—They produce complex nervous disturbances. Examples: Aconite, conium, curare, digitalis, lobelia, nicotine, physostigma, tobacco, etc.

In case of poisoning, action must be prompt if the life of the person is to be saved.

The first rule is, "Never wait for a remedy, however perfect, if an imperfect one is at hand." That is best which is readiest, the grand rule being *to lose no time.*

In case of poisoning a physician should be summoned at once. The general modes of treatment to be administered may be stated as follows:

1. Get rid of the poison.
2. Stop its action.
3. Remedy the mischief done.
4. Fight against the tendency to death.

1. To get rid of the poison, if it has been swallowed, is the first thing to be done. To this end one may employ the stomach-pump, stomach-tube, or emetics.

It is not advisable to use the stomach-pump for the removal of corrosive poisons because of the danger of perforating the stomach wall with it. Vomiting is frequently one of the first symptoms of poisoning, and in such cases nature may be assisted by administering copious draughts of lukewarm water (35° to 40° C.). Of the emetics, zinc sulphate is perhaps the most valuable, since its action is more prompt and its effects less depressing than other emetics, save, perhaps, mustard. Zinc sulphate may be administered in 1-gm. (15-gr.) doses. Mustard, ranking in efficiency with zinc sulphate, is more commonly found in the average household. It may be administered in from 1 to 2 teaspoonfuls in a teacupful of warm water, frequently repeated. Tincture of ipecac, 15 to 30 mils in a wineglassful of water, may also be used.

In the absence of these, common salt may prove efficaceous in the proportion of a handful in a pint of lukewarm water. Vomiting may also be produced by tickling the fauces with the finger or a feather, or by the free administration of warm water alone.

When the poison has been applied locally, as in snake bite, the circulation should, if possible, be cut off by applying a ligature as near as possible to the wound and between it and the heart. The wound may then be enlarged with a knife and freely cleansed with water or solution of potassium permanganate; sucking by the mouth may be employed and without danger to the operator, since snake venom is harmless unless introduced directly into the circulation.

Dog bites (if rabies is suspected) should be cauterized with strong nitric acid (the excess of acid to be neutralized with sodium bicarbonate as soon as it has penetrated to all parts of the wound) and the patient placed in the hands of a *physician.*

2. To stop the action of the poison in case it cannot be readily and immediately removed.

In this case an antidote is ordinarily administered.

An antidote may be defined as any drug which counteracts the effects of a poison. Usually they are classified as *Chemical Antidotes* and *Physiologic Antidotes* or *Antagonists*.

A chemical antidote is one which enters into chemical combination with the poison. This union may result in modifying its properties, as acid and alkali, or may render it insoluble and hence incapable of entering the circulation, or its poisonous molecule may be destroyed, usually by oxidation.

A physiologic antidote is one whose action on the system is directly antagonistic to that of the poison. They are frequently counterpoisons, such as physostigmine and atropine; aconite and digitalis, etc.

As antidotes are not general in character, they will be given in their proper place in the list of poisons and antidotes.

3 and 4 may be considered together, and have for their object the alleviation of the symptoms as they arise. This generally constitutes the "after-treatment," and a physician is usually at hand. Such treatments as can be predicted will be given in their proper place in the list of poisons and their antidotes.

LIST OF POISONS AND ANTIDOTES

ACETANILIDE—Antipyrine.—L. D., 1 gm. Place patient in a recumbent position, loosen clothing about the upper part of the body, allow plenty of fresh air. Respiratory stimulants (aromatic spirit of ammonia, strychnine), circulatory stimulants (atropine and belladonna); external heat, artificial respiration, oxygen inhalations if cyanosis is excessive.

ACID, CARBOLIC.—See *Phenol.*

ACID, HYDROCYANIC.—F. P. very short, ten to fifteen minutes; L. D., 1 mil. Place in a recumbent position, allow plenty of fresh air, empty stomach with pump, mustard, or zinc sulphate. Keep body warm. Chemical antidotes, cobalt nitrate and ferrous salts, followed by potassium carbonate solution. Cautious inhalation of ammonia; cold affusions to the spine. If breathing ceases, use artificial respiration.

ACID, OXALIC.—F. P. short, less than one hour; L. D., 15 gm. Empty the stomach with tube or emetics. Neutralize with chalk, whiting, lime-water, or other soluble or sparingly soluble calcium compound in order to neutralize the acid and form the insoluble calcium oxalate. Do not use soda, potassa, or ammonia, as the oxalates of these bases are as poisonous as the acid. An enema, oils and opium, may be useful.

ACIDS, MINERAL—Hydrochloric, Nitric, Nitrohydrochloric, Sulphuric.—F. P. eight to thirty hours, depending upon the rate of corrosion; L. D., 4 to 15 mils of stronger acid. Unless the acid was freely diluted before administration, the destruction of tissue will have been so great as to render the use of the stomach-pump dangerous and emetics useless. Administer weak alkalies, magnesia, dilute soda, or potassa (avoid the use of carbonates, as the volume of carbon dioxide liberated may burst the stomach). The bland oils, soap, eggs, milk, mucilage of acacia, etc., to soothe the mucous membrane. Opium hypodermically to relieve pain. Apply external heat and stimulants to overcome depression and collapse.

ACONITE.—F. P. forty-five minutes to forty hours, average eight hours; L. D., 2 to 4 mils; fldext., 4 mg. of aconitine. See *Alkaloidal Poisoning.* Supplement by placing the body in a recumbent position with the head the lowest; use atropine hypodermically, or tincture of belladonna orally, 1½ mils repeated; tincture of digitalis orally, 2 mils, to increase heart action. Use ammonia, brandy, or strychnine as stimulants.

ALKALIES—Ammonia Water, Potassium Hydroxide and its Solution, Sodium Hydroxide and its Solution, Concentrated Lye.—These usually cause vomiting. Give plenty of lukewarm water, followed by lemon juice, vinegar, tartaric or citric acid in 20 per cent. aqueous solution, olive oil 4 to 15 mils, whites of eggs, milk, demulcent drinks (arrowroot, starch, elm, barley, or flaxseed water). Water may be freely given. Relieve pain with laudanum, 15 to 20 drops, or morphine hypodermically.

ALKALOIDAL POISONING.—General Treatment: To render the alkaloids insoluble administer tannic acid, preparations containing tannic acid, animal charcoal, diluted Lugol's solu*tion.* Then promptly evacuate the stomach, using emetics or pump. Administer cathartics. Keep the body warm; use artificial respiration if necessary. For physiologic antidotes, see under the respective alkaloid.

AMMONIA.—See *Alkalies*. When inhaled, give, by inhalation, vapor of acetic acid, or hydrochloric acid or chlorine water.

ANTIMONY—Salts and Preparations.—F. P. eight to ten hours; L. D., 120 to 600 mg. of tartar emetic. Free emesis should be encouraged. Use, if necessary, mustard, zinc sulphate, apomorphine, or pump. Follow with strong tea, coffee, solutions of tannic or gallic acid to form insoluble tannate. Administer demulcents freely (flaxseed, white of egg, milk, slippery elm, starch-water, etc.). Keep the body warm. Use opium to relieve pain. Use atropine, digitalis, strychinne to prevent collapse.

ANTIPYRINE.—See *Acetanilide*. L. D., 1 gm.

ARSENIC—Salts and Preparations (Poison Fly Paper, "Rough on Rats," Fowler's Solution, etc.).—M. L. D., 120 mg., F. P. twelve to forty-eight hours.

If vomiting is present, encourage it with copious draughts of warm water. If not present, empty the stomach with mustard, zinc sulphate, apomorphine, pump, or tube. Administer freely either the official "arsenic antidote" or ferric hydroxide magma, N. F., to form the insoluble ferric arsenite or arsenate, as the case may be. Oil and mucilaginous drinks may be administered, also stimulants in case of faintness. Keep the body warm. Relieve pain with opium or morphine. If purging is not a symptom, administer castor oil.

ATROPINE.—See *Belladonna*.

BARIUM COMPOUNDS.—See *Lead Compounds*.

BELLADONNA (ATROPINE), HYOSCYAMUS (HYOSCYAMINE), STRAMONIUM (DATURINE), DULCAMARA (SOLANINE), DUBOISIA (DUBOISINE).—M. L. D., 120 mg. atropine; 4 mils fldext. See *Alkaloidal Poisoning*. Supplement by antagonizing the nervous disturbances by administering 30 mg. pilocarpine nitrate, or instead use morphine, opium, physostigmine. In case of exhaustion, use strychnine, give stimulants, (whisky or brandy) or ammonia to the nostrils. Use artificial respiration if necessary.

BINIODIDE OF MERCURY.—See *Mercury Salts.*

BROMIDES.—Give strong coffee, caffein citrate, digitalis, morphine as antagonist for mental symptoms; belladonna and ergot are sometimes used.

BROMINE.—Give albumen, starch, gelatine, weak alkalies (bicarbonates), etc., to protect the mucous membranes. To relieve the irritation caused by its vapors give ammonia vapor cautiously by inhalation or steam inhalation. For local burns, etc., apply $\frac{1}{2}$ per cent. solution of carbolic acid.

CANTHARIDES.—M. L. D., 2 gm. of powder; 30 mils tincture. Mucilage of acacia or boiled starch to lessen local irritations; stomach-pump, emetics; large quantities of water to flush the kidneys. Opium to relieve pain. Avoid oils, fats, or milk, which promote absorption of the poison.

CARBOLIC ACID.—See *Phenol.*

CASTOR BEANS.—L. D., 3 to 20 beans; F. P., slow poison, Give emetics, demulcent drinks, opium to quiet violent symptoms.

CHLORAL HYDRATE.—M. L. D., 2 gm; F. P. variable, may be several hours. Evacuate stomach with mustard, zinc sulphate, apormorphine, ipecac, or stomach-pump. Give strong coffee, keep patient warm. Keep patient awake, administer strychnine hypodermically. Stimulate heart with inhalations of amyl nitrite. Use artificial respiration if necessary.

CHLORATES AND NITRATES OF SODIUM AND POTASSIUM.—L. D., 20 to 30 gm.; F. P., nitrates, rapid, two to thirty-six hours; chlorates, several days.. Empty the stomach by using mustard, 15 gm., or zinc sulphate, 1 gm.; or apomorphine. Give mucilaginous drinks to dilute the poison; opium to relieve pain; amyl nitrate inhalation. Avoid stimulants that would increase kidney congestion.

CHLORINE.—For chlorine preparations in the stomach administer albumen, mucilaginous drinks, very dilute ammonia-water; promote vomiting, then administer white of egg, flour, or lime-water. For chlorine inhalation, inhale, cautiously, ammonia vapor.

CHLOROFORM, ETHER, NITROUS OXIDE.—If by inhalation, lower the feet; pull tongue forward so as to admit plenty of fresh air. Use artificial respiration. Apply hot and cold douche; inhale amyl nitrite. If heart has stopped, give several taps over it, inhale ammonia, give atropine or strychnine. If swallowed, evacuate the stomach with stomach-pump or emetics. Administer large draughts of water containing sodium bicarbonate, and otherwise proceed as if it had been inhaled.

COCAINE.—M. L. D., 40 mg. Poisoning somewhat closely resembles atropine on pulse, pupils (dilates), sweat glands, and bowels. Administer emetics, then tannic acid, morphine as antagonist, ammonia inhalations; amyl nitrite to counteract heart depression.

COLCHICUM AND PREPARATIONS—Colocynth and Elaterin.—M. L. D., 3 gm. corm; 12 mils of wine. Promote vomiting by the use of emetics, mustard, zinc sulphate, ipecac, apomorphine hypodermically (4 to 5 drops of 2 per cent. sol.); follow with tannic acid, 2-gm. doses; give strong tea or coffee; plenty of water and demulcents, morphine to allay pain and to antagonize heart depression. Keep patient warm.

CONIUM.—F. P. one to three hours; M. L. D., 2 drops of alkaloid. Evacuate the stomach with mustard, zinc sulphate, apomorphine, or stomach-pump; administer tannic acid, strong coffee, or any liquid containing tannic acid; administer stimulants, strychnine; exercise the patient; keep the body warm; use artificial respiration.

CREOSOTE AND PREPARATIONS.—See *Phenol.*

CROTON OIL.—M. L. D., 2 mils; F. P. four to six hours. Evacuate the stomach, using mustard, zinc sulphate, apomorphine, or stomach-pump, give 20 drops of tincture of opium every twenty minutes or 10 mg. of morphine hypodermically, until pain and purging are abated. Administer demulcent drinks (elm, flaxseed water, milk, white of egg, etc.); stimulants (alcoholic liquids, ammonia).

DIGITALIS, APOCYNIN, SCILLAIN, STROPHANTHUS, STROPHANTHIN, CONVALLARIA, SCOPARIUS.—L. D., 8 to 15 mils of tincture of digitalis. Evacuate the stomach with emetics or stomach-pump, follow with strong tea or coffee, tannic acid, or gallic acid. Hypodermic of aconitine nitrate, 0.3 mg. Keep patient in a recumbent position to prevent fainting. Use opium. Saponin (tincture of soapbark) or senegin (tincture of senega) are physiologic antidotes. Use atropine in case of collapse.

ERGOT AND PREPARATIONS.—M. L. D. Only very large doses have proved fatal. Evacuate the stomach, using mustard, zinc sulphate, apomorphine, or stomach-pump. Administer purgative (1 drop of croton oil) and plenty of warm drinks. Allow recumbent position, sustain heart action, administer amyl nitrite by inhalation, nitroglycerin, 1 mg., every fifteen minutes. Keep the patient warm.

HENBANE AND PREPARATIONS.—See *Belladonna.* Chloral may be used to advantage.

LEAD ACETATE.—See *Lead Compounds.*

LEAD COMPOUNDS—Lead Chromate and Acetate; also BARIUM COMPOUNDS.—M. L. D. not determined. Danger due to chromic poisoning. Use emetics or stomach-pump. Administer sulphate solutions, as magnesium sulphate or sodium sulphate, very dilute aromatic sulphuric acid; milk, demulcent drinks, opium or morphine to relieve pain. For lead-colic apply hot-water bag or hot fomentations. For chronic lead-poisoning give iodides, preferably those of calcium or sodium, sulphurated baths, using 15 to 30 gm. sulphurated potassa in water.

MERCURIC CHLORIDE.—See *Mercury Salts.*

MERCURY SALTS.—L. D., 0.2 to 0.5 gm.; F. P. rapidly fatal, one-half to several days. Use emetics or stomach-pump, white of egg, milk; opium to relieve pain.

MINERAL ACIDS.—See *Acids, Mineral.*

MORPHINE.—See *Opium.*

MUSHROOMS, MUSCARINE.—Evacuate the stomach by the use of emetics or stomach-pump. Use atropine as physiologic antagonist. Use stimulants; give full doses of castor oil. Keep the body warm.

NUX VOMICA, IGNATIA, STRYCHNINE, BRUCINE.—M. L. D., 2 gm. nux vomica; 15 to 30 mg. strychnin. F. P., rapidly fatal. Promptly anesthetize with chloroform, chloral or bromides by rectum; amyl nitrite hypodermically to relax spasm of the respiratory muscles, then chloroform by inhalation. Wash out stomach with tube while under the influence of the anesthetic; bromides or chloral may be administered through it. Avoid ether and emetics; guard the patient against loud noises and jars.

OIL OF BITTER ALMONDS.—See *Acid, Hydrocyanic.*

OPIUM AND PREPARATIONS—Laudanum, Morphine, Codeine; also Heroin and Dionin, Lactucarium and Cannabis.—L. D., 0.5 gm. opium; 65 mg. morphine; 2 to 3 drops of laudanum in case of infants. F. P. five to twelve hours.

Give at once the chemical antidote as solution of potassium permanganate or tannic acid; then evacuate the stomach with emetics or stomach-pump. Wash out the stomach with hot coffee, leaving in it as much as a pint or more of coffee. Keep the body warm. Use hypodermic of atropine, 0.5 mg. every fifteen minutes for three doses. Keep patient awake by shaking or walking between attendants. Give inhalations of amyl nitrite. Maintain respiration. Use artificial respiration.

OXALIC ACID.—See *Acid, Oxalic.*

PHENOL, CREOSOTE, RESORCIN.—M. L. D., 4 gm. or mils. F. P. three minutes to sixty hours, average three hours. Administer alcohol or soluble sulphates to be followed by emetics. Vomit the patient with warm water containing sodium bicarbonate or zinc sulphate, or use stomach-pump. Soothe the mucous membranes by use of milk and albumen. Avoid glycerin and oils. Stimulate the patient with digitalis, strychnine, or atropine. Keep the body warm. Opium to relieve pain. Chemical antidote, hydrogen peroxide.

PHOSPHORUS AND PREPARATIONS—Rat Poison, Matches.—L. D., 6 to 65 mg., 2 match heads have caused death of child., F. P. one to five days (lingering poison). Evacuate stomach, copper sulphate 200 mg. every five minutes until vomiting is sufficient. Give charcoal and lime-water. Wash out stomach with 2 to 3 gallons of 1 per cent. solution of potassium permanganate. Use 15 gm. magnesium sulphate in a glass of water as a cathartic. Opium to relieve pain. White of egg as a demulcent. *Never* use oils or fats, as these dissolve the poison and hasten its absorption.

POTASSIUM CYANIDE.—L. D., 0.2 to 0.5 gm. See *Acid, Hydrocyanic.*

RAT POISON.—See *Arsenic* and *Phosphorus.*

RED PRECIPITATE.—See *Mercury Salts.*

ROACH PASTE.—See *Arsenic* and *Phosphorus.*

SAVINE AND PREPARATIONS.—Irritant poison. Secure evacuation of the stomach; if necessary use mustard, zinc sulphate, ipecac, or stomach-pump. Secure bowel movement, if necessary use 30 gm. of castor oil or of magnesium sulphate. Allay pain with morphine and demulcents.

STRYCHNINE.—See *Nux Vomica.*

TURPENTINE.—M. L. D., 120 mils. F. P. twelve hours. Evacuate the stomach with mustard or zinc sulphate or stomach-pump. Administer milk, mucilage of acacia, demulcents, and plenty of water to eliminate it through the kidneys. If there is no purging, give enema. Allay pain with opium.

ZINC SULPHATE.—L. D., 30 to 45 gm. Danger usually due to mistaking it for magnesium sulphate. F. P. four to thirteen hours. In case emesis is not free, evacuate the stomach with the pump or tube. For mode of treatment see *Lead Compounds.*

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